

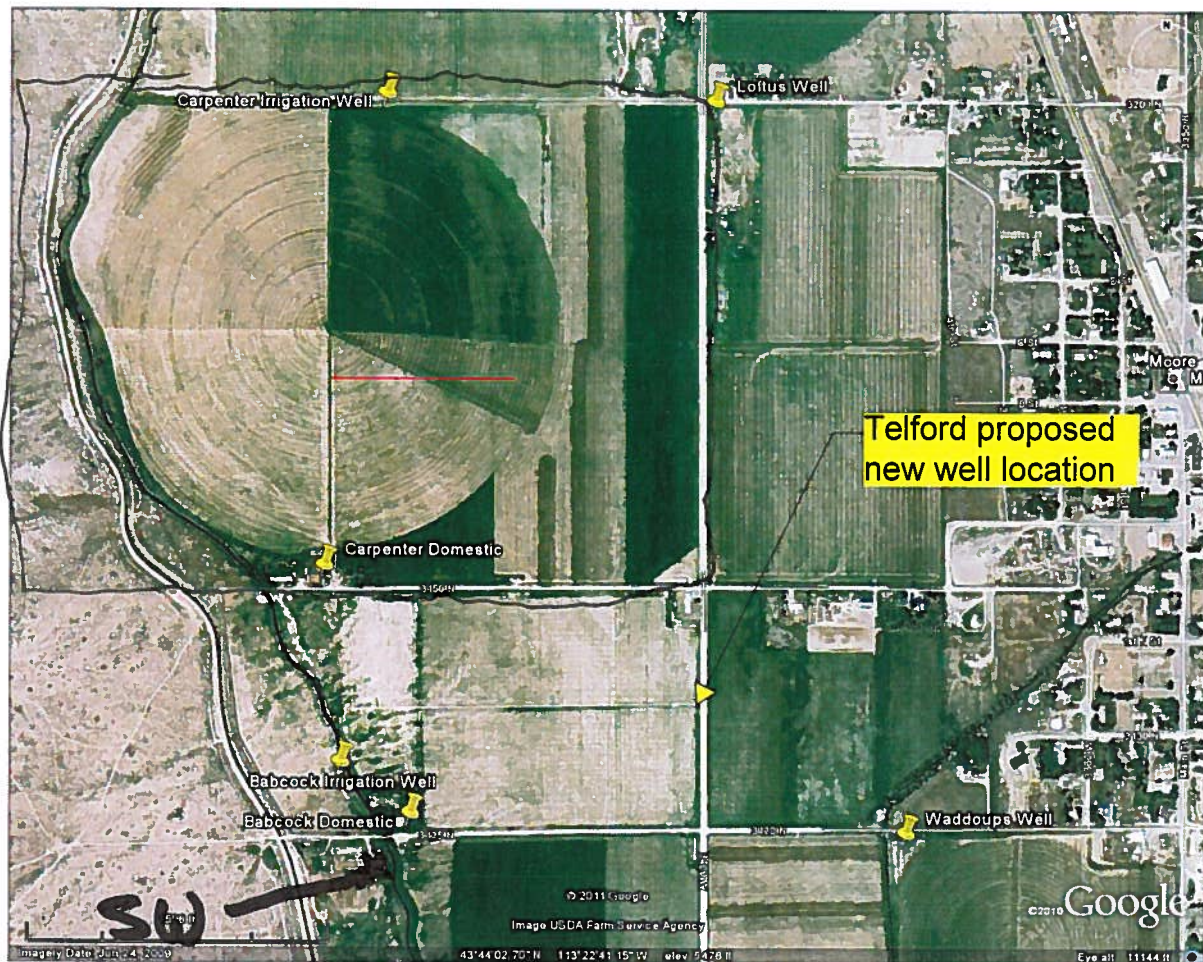
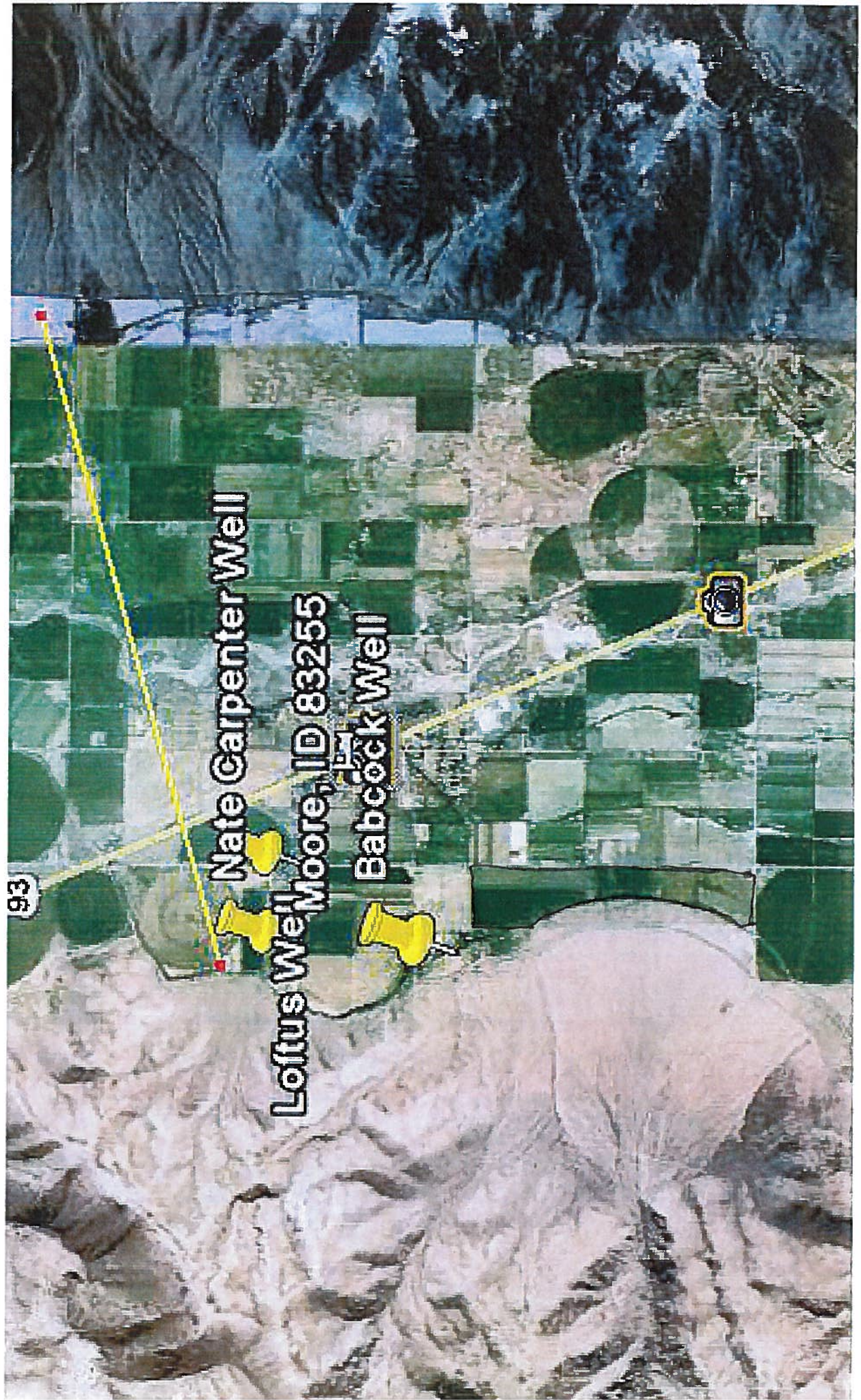


Figure 8 Location map for wells in the area. The red line is 1000 ft long. The Nate Carpenter Irrigation Well was the pumped well and the Loftus and Babcock Wells were the observation wells.



Close

IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

4/26/2011

WATER RIGHT NO. 34-14168

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	CRYSTAL A CARPENTER
Current Owner	NATHAN D CARPENTER
	PO BOX 307
	ARCO, ID 83213
	(208)554-2523
Original Owner	MARION PEARSON
	MOORE, ID

Priority Date: 09/16/1960

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	11/01	2.9 CFS	
Total Diversion			2.9 CFS	

Location of Point(s) of Diversion:

GROUND WATER	NENWNE	Sec. 29	Township 05N	Range 26E	BUTTE County
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IRRIGATION Use:

Acre Limit: 144.8

EXHIBIT P2**P00188**

Place(s) of use:

Place of Use Legal Description: IRRIGATION BUTTE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		NENE	38		NWNE	39		SWNE	36		SENE	38
				NENW	21		SENE	9						

Total Acres: 181

Conditions of Approval:

1.	C18	THIS PARTIAL DECREE IS SUBJECT TO SUCH GENERAL PROVISIONS NECESSARY FOR THE DEFINITION OF THE RIGHTS OR FOR THE EFFICIENT ADMINISTRATION OF THE WATER RIGHTS AS MAY BE ULTIMATELY DETERMINED BY THE COURT AT A POINT IN TIME NO LATER THAN THE ENTRY OF A FINAL UNIFIED DECREE. SECTION 42-1412(6), IDAHO CODE.
2.		USE OF THIS RIGHT WITH RIGHT NO. 34-14170 IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 2.90 CFS AND TO A TOTAL COMBINED ANNUAL DIVERSION VOLUME OF 633.5 AF
3.	K06	This right is limited to the irrigation of 144.8 acres within the place of use described above in a single irrigation season.
4.	C05	RIGHT INCLUDES ACCOMPLISHED CHANGE IN PLACE OF USE PURSUANT TO SECTION 42-1425, IDAHO CODE.
5.	K01	RIGHT NUMBER 34-14170 IS AN ENLARGEMENT OF THIS RIGHT PURSUANT TO SECTION 42-1426, IDAHO CODE.
6.		RIGHT NO. 34-14170 IS ALSO DIVERTED THROUGH POINT OF DIVERSION DESCRIBED ABOVE.
7.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 4.75 CFS. COMBINED RIGHT NOS.: 34-14154, 34-14156, 34-14158, 34-14160, 34-14162, 34-14164, 34-14166, 34-14168 AND 34-14170.
8.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO THE IRRIGATION OF A COMBINED TOTAL OF 181 ACRES IN A SINGLE IRRIGATION SEASON. COMBINED RIGHT NOS.: 34-14154, 34-14156, 34-14158, 34-14160, 34-14162, 34-14164, 34-14166, 34-14168 AND 34-14170.

Dates:

Licensed Date:

Decreed Date: 12/14/2001

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

P00189

Application Received Date:
Protest Deadline Date:
Number of Protests: 0

Other Information:
State or Federal: S
Owner Name Connector: AND
Water District Number: 34
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Civil Case Number:
Old Case Number:
Decree Plaintiff:
Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Close

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

4/26/2011

WATER RIGHT NO. 34-14170

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	CRYSTAL A CARPENTER
Current Owner	NATHAN D CARPENTER
	PO BOX 307
	ARCO, ID 83213
	(208)554-2523

Priority Date: 09/16/1972

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	10/31	0.58 CFS	
Total Diversion			0.58 CFS	

Location of Point(s) of Diversion:

GROUND WATER	NENWNE	Sec. 29	Township 05N	Range 26E	BUTTE County
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IRRIGATION Use:

Acre Limit: 36.2

Place(s) of use:

EXHIBIT P3**P00191**

Place of Use Legal Description: IRRIGATION BUTTE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		NENE	38		NWNE	39		SWNE	36		SENE	38
				NENW	21		SENE	9						

Total Acres: 181

Conditions of Approval:

1.	C18	THIS PARTIAL DECREE IS SUBJECT TO SUCH GENERAL PROVISIONS NECESSARY FOR THE DEFINITION OF THE RIGHTS OR FOR THE EFFICIENT ADMINISTRATION OF THE WATER RIGHTS AS MAY BE ULTIMATELY DETERMINED BY THE COURT AT A POINT IN TIME NO LATER THAN THE ENTRY OF A FINAL UNIFIED DECREE. SECTION 42-1412(6), IDAHO CODE.
2.		USE OF THIS RIGHT WITH RIGHT NO. 34-14168 IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 2.90 CFS AND TO A TOTAL COMBINED ANNUAL DIVERSION VOLUME OF 633.5 AF
3.		RIGHT NO. 34-14168 IS ALSO DIVERTED THROUGH POINT OF DIVERSION DESCRIBED ABOVE.
4.	K02	THIS RIGHT IS BASED UPON AN ENLARGEMENT OF RIGHT NO. 34-14168 TO SECTION 42-1426, IDAHO CODE.
5.	K09	THIS RIGHT IS FOR AN ENLARGEMENT OF 36.2 ACRES WITHIN THE PLACE OF USE DESCRIBED FOR THIS RIGHT.
6.	C11	THIS WATER RIGHT IS SUBORDINATE TO ALL WATER RIGHTS WITH A PRIORITY DATE EARLIER THAN APRIL 12, 1994, THAT ARE NOT DECREED AS ENLARGEMENTS PURSUANT TO SECTION 42-1426, IDAHO CODE. AS BETWEEN WATER RIGHTS DECREED AS ENLARGEMENTS PURSUANT TO SECTION 42-1426, IDAHO CODE, THE EARLIER PRIORITY RIGHT IS THE SUPERIOR RIGHT.
7.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 4.75 CFS. COMBINED RIGHT NOS.: 34-14154, 34-14156, 34-14158, 34-14160, 34-14162, 34-14164, 34-14166, 34-14168 AND 34-14170.
8.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO THE IRRIGATION OF A COMBINED TOTAL OF 181 ACRES IN A SINGLE IRRIGATION SEASON. COMBINED RIGHT NOS.: 34-14154, 34-14156, 34-14158, 34-14160, 34-14162, 34-14164, 34-14166, 34-14168 AND 34-14170.

Dates:

Licensed Date:

Decreed Date: 12/14/2001

Enlargement Use Priority Date:

Enlargement Statute Priority Date: 4/12/1994

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

P00192

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector: AND

Water District Number: 34

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plaintiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

Close

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

5/9/2011

WATER RIGHT NO. 34-10134

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	CRYSTAL A CARPENTER
Current Owner	NATHAN D CARPENTER
	PO BOX 307
	ARCO, ID 83213
	(208)554-2523

Priority Date: 09/16/1896

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
DOMESTIC	1/01	12/31	0.04 CFS	
Total Diversion			0.04 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SWSWNE	Sec. 29	Township 05N	Range 26E	BUTTE County
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Place(s) of use:

Place of Use Legal Description: DOMESTIC BUTTE County

EXHIBIT P4**P00283**

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		SWNE										

Conditions of Approval:

1.	N13	THE QUANTITY OF WATER UNDER THIS RIGHT SHALL NOT EXCEED 13,000 GALLONS PER DAY.
2.	N11	THE QUANTITY OF WATER DECREED FOR THIS WATER RIGHT IS NOT A DETERMINATION OF HISTORICAL BENEFICIAL USE.

Dates:

Licensed Date:

Decreed Date: 12/10/1996

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector: AND

Water District Number: 34

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plaintiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

Close

P00284

Idaho Department of Water Resources
1301 North Orchard Boise ID 83706-2237

Write Tag Number Here

D0024622**Start Card/Permit for a Domestic Well**

(Not Valid Without Tag Number)

(Cold Water 85 degrees or less)

Press Hard

1. Well Owner (please print): NATHAN CARPENTER
2. Owner's Address: P.O. Box 307
City Arco State ID Zip 83213 Phone (208) 554-2523
3. Well Location: Twp: 5N Rge: 26E Sec. 29 1/4 SW 1/4 NE
Gov't Lot No. _____ County Batte Lat _____ Long _____
Street Address of Well Site 3430W. 3150N
City Moore Lot _____ Block _____ Sub. _____

4. Well Construction Information:

☒ New Construction, [] Deepen, [] Modify, [] Replace Existing Well (Previous # _____)

5. Construction Start Date: 7/2/02 6. Well Driller G. K. H. K. License # 226

7. Signature of Driller or Owner: Doug Nauden Date 7/1/02

Submit White Copy to Department of Water Resources

Applicant agrees to comply with the Underground Facilities Damage Prevention Act I.C. 55-2201 et seq. and contact the locator service telephone number Digline 1-800-342-1585 prior to commencing excavation.

EXHIBIT P5**P00209**

4/4/2003

2630

PAID
04/14/2003

Carpenter, Nathan
PO Box 307
Arco, ID 83213

Net 10

Pull Pump 120'		
Set Pump 140' 10" x 2" x 1 & 3/16" Lane	1,040.00	1,040.00
New 14M 270 1 Stage Bowl	2,100.00	2,100.00
20' New 10" x 2" x 1 & 3/16" Tube & Shaft	500.00	500.00
Used 60 HP Motor	1,600.00	1,600.00
New Panel and Wiring	900.00	900.00
New 12" Cone Strainer	225.00	225.00
New Stretch Assembly	425.00	425.00
TRADE IN CREDIT: (40HP Motor \$600.00 & 150 HP Motor \$2300.00)	-2,900.00	-2,900.00
<i>Total Work done on well</i>	~~6,780.00~~	
<i>Went from 40hp motor to 60hp</i>	6,790.00	

Your Business is Appreciated

\$3,890.00

EXHIBIT P6**P00216**

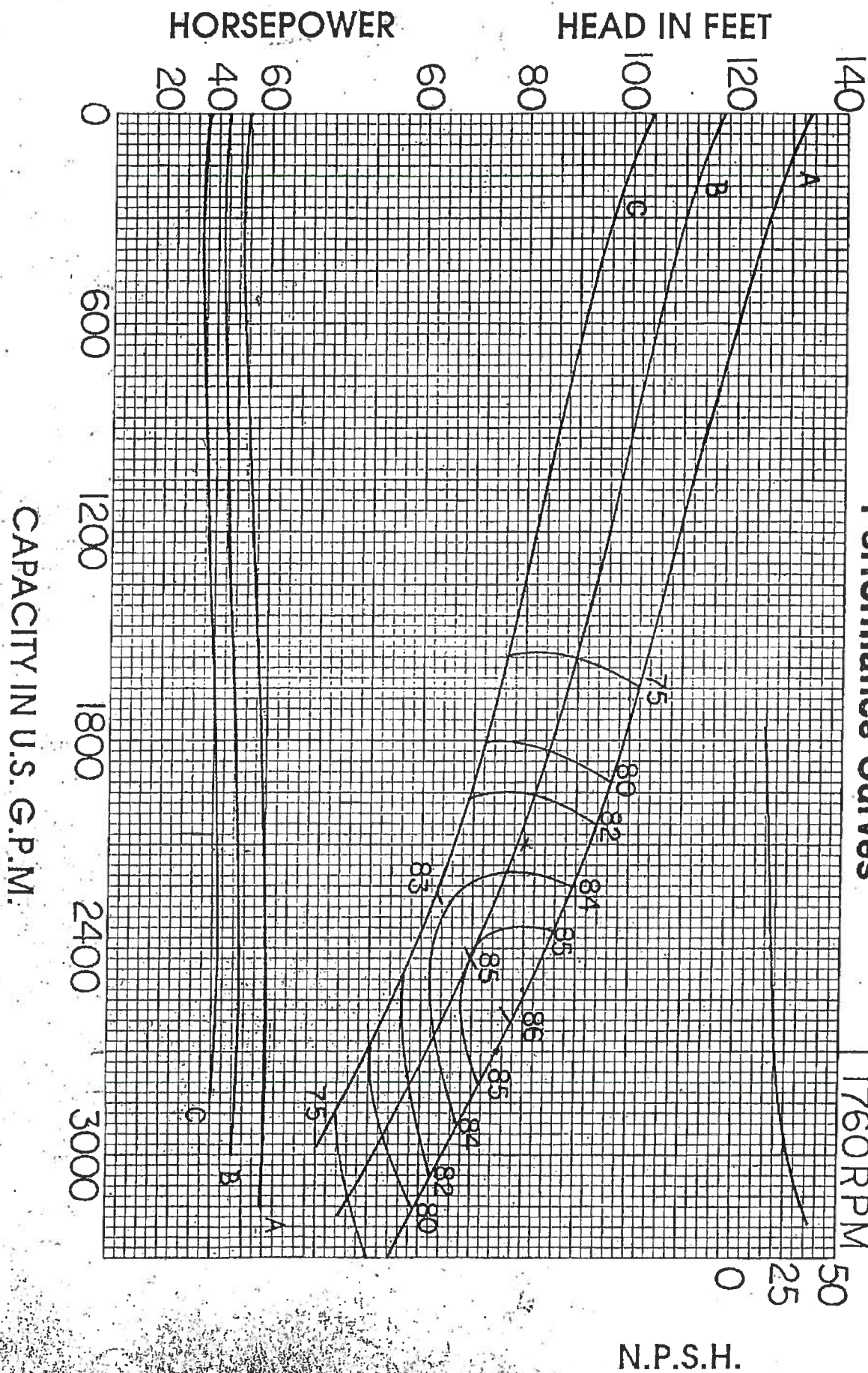
60 HP - 1 stage
14 m 270



Performance Curves

14-M-270

1760RPM



07/2008

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

NOTICE OF PROTEST

This form may be used to file a protest with the department under sections 42-108B, 42-203A, 42-203C, 42-211, and 42-222, Idaho Code. The department will also accept a timely protest not completed on this form if it contains the same information.

1. Matter being protested 76286
2. Name of protestant Nathan Carpenter
3. Protestant's Representative for service (If different than protestant)

4. Service mailing address P.O. Box 307 Arco Idaho 83213
5. Service telephone no. 554-2523 Email Address: _____

6. Basis of protest (including statement of facts and law upon which the protest is based)

I protest the drilling of well by Mike Telford on Bryce
Burnett's property because I believe it will greatly adversely
affect wells in the Big Lost River Valley. Irrigation and domestic
wells alike. We cannot afford any more depletion of our aquifer.
(additional pages may be attached to describe nature of the protest)

7. What would resolve your protest? Not to drill this well or
any more irrigation wells in this valley.

I hereby, acknowledge that if I, or my designated representative, fails to appear at any regularly scheduled conference or hearing in the matter of which I have been notified at the address above, the department may issue a notice of proposed default against me in this matter for failure to appear. I also verify that I have served a copy of this protest upon the applicant.

Signed this 17th day of March, 2010.

Nathan D. Carpenter
Protestant

RECEIVED

Protestant's Representative

MAR 17 2010

Department of Water Resources
Eastern Region

EXHIBIT P7

Receipt
#E035654

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

5/6/2011

WATER RIGHT NO. 34-2330A

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MARJORIE J BABCOCK
Current Owner	REUBEN H BABCOCK
	PO BOX 14
	MOORE, ID 83255
	(208)527-3609
Original Owner	CARL J RINDFLEISCH
	MOORE, ID

Priority Date: 05/05/1955

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	4/01	10/31	1.75 CFS	
Total Diversion			1.75 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SENWSE	Sec. 29	Township 05N	Range 26E	BUTTE County
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IRRIGATION Use:

EXHIBIT P8**P00231**

Acre Limit: 135

Place(s) of use:

Place of Use Legal Description: IRRIGATION BUTTE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		SWSE	8		SESE	37						
		32		NENE	31		SENE	24						
				NESE	25		SESE	31						

Total Acres: 156

Conditions of Approval:

1.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 5.11 CFS. COMBINED RIGHT NOS.: 34-00354, 34-10397 AND 34-12377. USE OF THIS RIGHT WITH RIGHT NO. 34-12377 IS LIMITED TO A TOTAL COMBINED ANNUAL DIVERSION VOLUME OF 546.0 AF.
2.		USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO THE IRRIGATION OF A COMBINED TOTAL OF 156 ACRES IN A SINGLE IRRIGATION SEASON. COMBINED RIGHT NOS.: 34-00354, 34-10397 AND 34-12377. THIS RIGHT IS LIMITED TO THE IRRIGATION OF 135 ACRES WITHIN THE PLACE OF USE DESCRIBED ABOVE IN A SINGLE IRRIGATION SEASON.
3.	C18	THIS PARTIAL DECREE IS SUBJECT TO SUCH GENERAL PROVISIONS NECESSARY FOR THE DEFINITION OF THE RIGHTS OR FOR THE EFFICIENT ADMINISTRATION OF THE WATER RIGHTS AS MAY BE ULTIMATELY DETERMINED BY THE COURT AT A POINT IN TIME NO LATER THAN THE ENTRY OF A FINAL UNIFIED DECREE. SECTION 42-1412(6), IDAHO CODE.
4.		THE COMBINED DIVERSION RATE LIMIT DESCRIBED ABOVE DOES NOT APPLY TO THE DELIVERY OF STORAGE WATER TO THE PLACE OF USE DESCRIBED ABOVE BY THE BIG LOST RIVER IRRIGATION DISTRICT. RIGHT NOS. 34-02330B, 34-12376 AND 34-12377 ARE ALSO DIVERTED THROUGH POINT OF DIVERSION DESCRIBED ABOVE.
5.	C05	RIGHT INCLUDES ACCOMPLISHED CHANGE IN PLACE OF USE PURSUANT TO SECTION 42-1425, IDAHO CODE.

Dates:

Licensed Date:

Decreed Date: 12/14/2001

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

P00232

Water Supply Bank Enrollment Date Removed:
Application Received Date:
Protest Deadline Date:
Number of Protests: 0

Other Information:
State or Federal: S
Owner Name Connector: AND
Water District Number: 34
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Combined Acres Limit:
Combined Volume Limit: 546
Combined Rate Limit:
Civil Case Number:
Old Case Number:
Decree Plaintiff:
Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Close

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

5/6/2011

WATER RIGHT NO. 34-12377

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MARJORIE J BABCOCK
Current Owner	REUBEN H BABCOCK
	PO BOX 14
	MOORE, ID 83255
	(208)527-3609

Priority Date: 06/01/1961

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	4/01	10/31	1.25 CFS	
Total Diversion			1.25 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SEnwSE	Sec. 29	Township 05N	Range 26E	BUTTE County
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Place(s) of use:

Place of Use Legal Description: IRRIGATION BUTTE County

EXHIBIT P9**P00223**

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		SWSE	8		SESE	35						
		32		NENE	30.8		SENE	26						
				NESE	25.2		SESE	31						

Total Acres: 156

Conditions of Approval:

1.	USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO A TOTAL COMBINED DIVERSION RATE OF 5.11 CFS. COMBINED RIGHT NOS.: 34-00354, 34-10397 AND 34-02330A. USE OF THIS RIGHT WITH RIGHT NO. 34-02330A IS LIMITED TO A TOTAL COMBINED ANNUAL DIVERSION VOLUME OF 546.0 AF.
2.	USE OF THIS RIGHT WITH RIGHTS LISTED BELOW IS LIMITED TO THE IRRIGATION OF A COMBINED TOTAL OF 156 ACRES IN A SINGLE IRRIGATION SEASON. COMBINED RIGHT NOS.: 34-00354, 34-10397 AND 34-02330A.
3. C18	THIS PARTIAL DECREE IS SUBJECT TO SUCH GENERAL PROVISIONS NECESSARY FOR THE DEFINITION OF THE RIGHTS OR FOR THE EFFICIENT ADMINISTRATION OF THE WATER RIGHTS AS MAY BE ULTIMATELY DETERMINED BY THE COURT AT A POINT IN TIME NO LATER THAN THE ENTRY OF A FINAL UNIFIED DECREE. SECTION 42-1412(6), IDAHO CODE.
4.	THE COMBINED DIVERSION RATE LIMIT DESCRIBED ABOVE DOES NOT APPLY TO THE DELIVERY OF STORAGE WATER TO THE PLACE OF USE DESCRIBED ABOVE BY THE BIG LOST RIVER IRRIGATION DISTRICT. RIGHT NOS. 34-02330A, 34-02330B AND 34-12376 ARE ALSO DIVERTED THROUGH POINT OF DIVERSION DESCRIBED ABOVE.

Dates:

Licensed Date:

Decreed Date: 12/14/2001

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector: AND

Water District Number: 34

P00224

Generic Max Rate per Acre:
Generic Max Volume per Acre:
Combined Acres Limit:
Combined Volume Limit: 546
Combined Rate Limit:
Civil Case Number:
Old Case Number:
Decree Plaintiff:
Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Close

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

5/9/2011

WATER RIGHT NO. 34-10404

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MARJORIE J BABCOCK
Current Owner	REUBEN H BABCOCK PO BOX 14 MOORE, ID 83255 (208)527-3609

Priority Date: 06/01/1889

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
DOMESTIC	1/01	12/31	0.04 CFS	
Total Diversion			0.04 CFS	

Location of Point(s) of Diversion:

GROUND WATER	SENWSE	Sec. 29	Township 05N	Range 26E	BUTTE County
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Place(s) of use:

Place of Use Legal Description: DOMESTIC BUTTE County

EXHIBIT P10**P00278**

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		NWSE										

Conditions of Approval:

1.	N13	THE QUANTITY OF WATER UNDER THIS RIGHT SHALL NOT EXCEED 13,000 GALLONS PER DAY.
2.	N11	THE QUANTITY OF WATER DECREED FOR THIS WATER RIGHT IS NOT A DETERMINATION OF HISTORICAL BENEFICIAL USE.

Dates:

Licensed Date:

Decreed Date: 12/10/1996

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector: AND

Water District Number: 34

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plaintiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

P00279

[Close](#)IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

5/20/2011

WATER RIGHT NO. 34-10405

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MARJORIE J BABCOCK
Current Owner	REUBEN H BABCOCK
	PO BOX 14
	MOORE, ID 83255
	(208)527-3609

Priority Date: 09/05/1969

Basis: Decreed

Status: Active

<u>Source</u>	<u>Tributary</u>
GROUND WATER	

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
STOCKWATER	1/01	12/31	0.05 CFS	
Total Diversion			0.05 CFS	

Location of Point(s) of Diversion:

GROUND WATER	NWSWSE	Sec. 29	Township 05N	Range 26E	BUTTE County
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Place(s) of use:

Place of Use Legal Description: STOCKWATER BUTTE County

EXHIBIT P11

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
05N	26E	29		SWSE										

Conditions of Approval:

1.	N13	THE QUANTITY OF WATER UNDER THIS RIGHT SHALL NOT EXCEED 13,000 GALLONS PER DAY.
2.	N11	THE QUANTITY OF WATER DECREED FOR THIS WATER RIGHT IS NOT A DETERMINATION OF HISTORICAL BENEFICIAL USE.
3.		STOCWATER FOR 160 RANGE CATTLE, AND 2 HORSES

Dates:

Licensed Date:

Decreed Date: 12/03/1996

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Water Supply Bank Enrollment Date Accepted:

Water Supply Bank Enrollment Date Removed:

Application Received Date:

Protest Deadline Date:

Number of Protests: 0

Other Information:

State or Federal: S

Owner Name Connector: AND

Water District Number: 34

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Civil Case Number:

Old Case Number:

Decree Plaintiff:

Decree Defendant:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

[illegible]

EXHIBIT P12

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

RECEIVED
U.S. AIR FORCE
ENGINEER

AUG 28 1970

1. WELL OWNER 17040218

Name Harold Babcock

Address Moore, Idaho

Owner's Permit No.

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test

☐ Municipal ☐ Industrial ☒ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 6 inches Total depth 68 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness 250 inches

Diameter 6 inches

From 0 feet To 68 feet

inches inches feet feet

inches inches feet feet

inches inches feet feet

inches inches feet feet

Was a packer or seal used? ☒ Yes ☐ No

Perforated? ☐ Yes ☒ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation inches by inches

Number From To

perforations feet feet

perforations feet feet

perforations feet feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name

Type Model No.

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☒ No Size of gravel

Placed from feet to feet

Surface seal? ☒ Yes ☐ No To what depth 30 feet

Material used in seal ☐ Cement grout ☒ Puddling clay

7. WATER LEVEL

Department of Water Administration

Static water level 42 feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow

Temperature F. Quality

Artesian closed-in pressure p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☒ Bailor ☐ Other

Discharge G.P.M.

Draw Down

Hours Pumped

20

2ft

2 Hours

9. LITHOLOGIC LOG

30119

Hole Diam.

Depth

Material

Water

Yes

No

6

0

4

Top Soil

4

68

Sand Gravel some Clay

X

6. LOCATION OF WELL

Sketch map location must agree with written location.

N

W

E

S

X

34

Butte

SW 1/4 SE 1/4 Sec. 29 T. 5 N. R. 26 E. 1/4

10.

Work started 10-18-69 finished 10-20-69

11. DRILLER'S CERTIFICATION

3030

70 11

This well was drilled under my supervision and this report is true to the best of my knowledge.

Findlay Well Drilling

62

Driller's or Firm's Name

Number

285 West Parsons

Blackfoot, Idaho

Address

B. Uday

7-14-70

Signed By

Date

USE ADDITIONAL SHEETS IF NE(P00282

EXHIBIT P13

Form 238-7
8/90

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well. JAN 03 1991

RECEIVED

[illegible]

-P00281

EXHIBIT P14

DEC 28 1999

10:30 AM
BUTTE COUNTY RECORDER
[Signature]

WELL USE AGREEMENT

This agreement is made and entered into this 24th day of September, 1999, by and between HAROLD BABCOCK and MARJORIE BABCOCK, his wife, of Butte County, Idaho, hereinafter referred to as **FIRST PARTY** and CANNON SHELLEY PROPERTY LIMITED PARTNERSHIP, an Idaho Limited Partnership Having As Its General Partners Alan M. Cannon Jr. and Katherine B. Cannon, husband and wife and Seth Alan Cannon, of Bingham County, Idaho, hereinafter referred to as **SECOND PARTY**,

WITNESSETH

That for and in consideration of the mutual covenants and agreements herein set forth, the parties hereto agree as follows:

1. **FIRST PARTY** is the record owner of the SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 29, T5N R26E, BM upon which an irrigation well, together with the pump, motor, electrical panel and other necessary and attendant equipment and facilities essential for diverting ground water and introducing the same into the delivery facilities, is located. Water has for many years been diverted from said well pursuant to water rights nos. 34-02230A and 34-12377, held by **FIRST PARTY**, and nos. 34-02330B and 34-12376, previously held by Everett T. Acor, Jr., and Eyleen Acor, his wife, and used for irrigation purposes by **FIRST PARTY** and the Acors on their respective farms. **SECOND PARTY** has purchased the interests of Acors and the parties hereto have agreed to restate, in writing, their relationship with respect to the operation, maintenance, inspection, repair, rehabilitation and replacement of said well and the attendant facilities and equipment.

2. **FIRST PARTY** hereby formally grants to **SECOND PARTY** a right-of-way and easement for access to the referenced well and facilities for the above described purposes and for the existing facilities for delivery of water under rights nos. 34-02330B and 34-12376 into the Moore Canal, and the operation, maintenance, inspection, repair, rehabilitation and replacement of the same.

3. The parties agree to share any and all electrical costs for operation of the motor and pump by means of which water is diverted from said well, on the basis of the amount of water diverted by and for the use of either party. Any and all rebates or credits from the supplier of electrical power for operation of the pump and motor shall be shared equally, as well as all costs of operation, maintenance, inspection, repair, rehabilitation and replacement of the well or any of the common equipment and facilities attendant thereto and used in connection therewith. It is understood that the bills or invoices from the electrical power provider presently come directly to **FIRST PARTY**, and upon receipt by **SECOND PARTY** of a legible copy thereof, together with a brief written division of the amount in accordance

EXHIBIT P15

with the power used by each, at **SECOND PARTY**'s address (707 East 1500 North, Shelley, Idaho 83274), **SECOND PARTY** shall pay **SECOND PARTY**'s proportionate share to the power provider forthwith. The parties agree to consult one another and to arrive at a mutual decision with respect to all other costs in advance of incurring any such.

4. Should either party default in the performance of any of the covenants or agreements contained herein, such defaulting party shall pay to the other party all costs and expenses, including, but not limited to, a reasonable attorney's fee, including such fees on appeal, which the offended party may incur in enforcing this agreement or in pursuing any remedy allowed by law for breach hereof, whether such is incurred by the filing of suit or otherwise.

5. This agreement shall be binding upon and inure to the benefit of the heirs, personal representatives, administrators, successors and assigns of the parties hereto.

Harold Babcock
Harold Babcock

Marjorie Babcock
Marjorie Babcock
FIRST PARTY

CANNON SHELLEY PROPERTY
LIMITED PARTNERSHIP

Alan M. Cannon, Jr.
Alan M. Cannon, Jr., General Partner

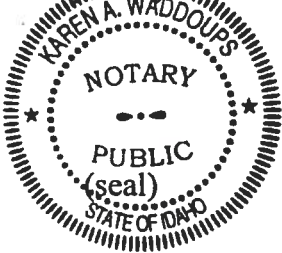
Katherine B. Cannon
Katherine B. Cannon, General Partner

Seth A. Cannon
Seth Alan Cannon, General Partner
SECOND PARTY

STATE OF IDAHO)
)ss.
County of Bonneville)

On the 23 day of ~~September~~ ^{November}, 1999, before me, the undersigned, a notary public in and for said State, personally appeared **HAROLD BABCOCK**, known or identified to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year in this certificate first above written.

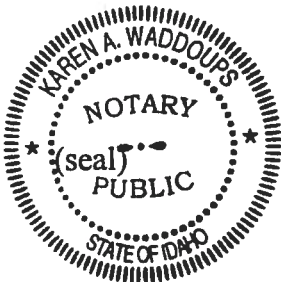



Notary Public for Idaho
Residing at Idaho Falls, Idaho
My Commission Expires: _____

STATE OF IDAHO)
)ss.
County of Bonneville)

On the 23 day of ~~September~~ ^{November}, 1999, before me, the undersigned, a notary public in and for said State, personally appeared **MARJORIE BABCOCK**, known or identified to me to be the person whose name is subscribed to the within instrument and acknowledged to me that she executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year in this certificate first above written.



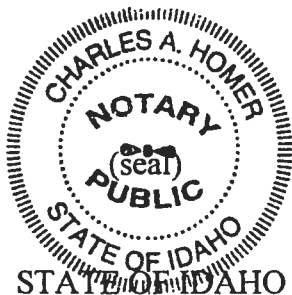

Notary Public for Idaho
Residing at Idaho Falls, Idaho
My Commission Expires: _____

EXHIBIT P17

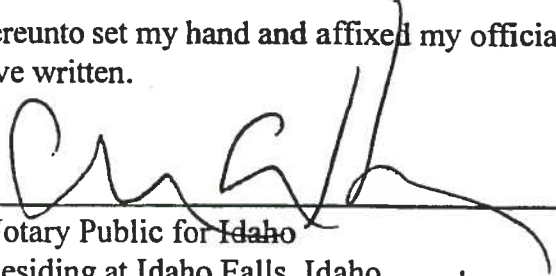
STATE OF IDAHO)
)ss.
County of Bonneville)

On the 24th day of September, 1999, before me the undersigned, a notary public in and for said State, personally appeared **ALAN M. CANNON, JR.**, known or identified to me to be one of the general partners in the partnership of **CANNON SHELLEY PROPERTY LIMITED PARTNERSHIP**, who subscribed said limited liability company name to the foregoing instrument, and acknowledged to me that such partnership executed the same in said limited liability company name.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.



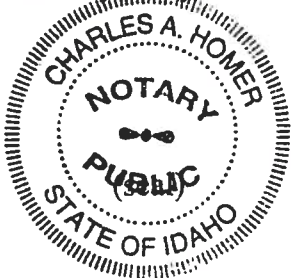
STATE OF IDAHO)
)ss.
County of Bonneville)

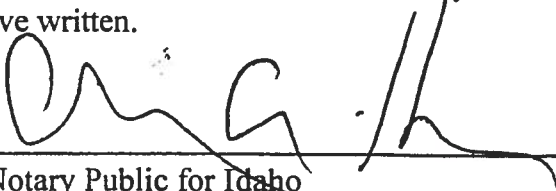


Notary Public for Idaho
Residing at Idaho Falls, Idaho
My Commission Expires: 12/6/2004

On the 24th day of September, 1999, before me the undersigned, a notary public in and for said State, personally appeared **KATHERINE B. CANNON**, known or identified to me to be one of the general partners in the partnership of **CANNON SHELLEY PROPERTY LIMITED PARTNERSHIP**, who subscribed said limited liability company name to the foregoing instrument, and acknowledged to me that such partnership executed the same in said limited liability company name.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.



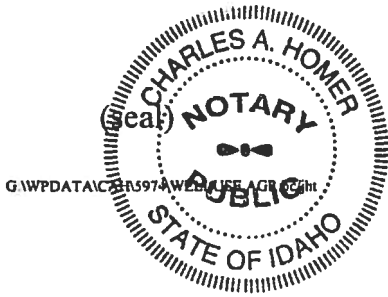


Notary Public for Idaho
Residing at Idaho Falls, Idaho
My Commission Expires: 12/6/2004

STATE OF IDAHO)
)ss.
County of Bonneville)

On the 24th day of September, 1999, before me the undersigned, a notary public in and for said State, personally appeared **SETH ALAN M. CANNON**, known or identified to me to be one of the general partners in the partnership of **CANNON SHELLEY PROPERTY LIMITED PARTNERSHIP**, who subscribed said limited liability company name to the foregoing instrument, and acknowledged to me that such partnership executed the same in said limited liability company name.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.



[Signature]
Notary Public for Idaho
Residing at Idaho Falls, Idaho
My Commission Expires: 12/1/2007

EXHIBIT P16

Department of Water Resources
Eastern Region

MAR 22 2010

Director of Idaho Department of Water Resources

RECEIVED

Eastern region

900 N Skyline Dr. Ste A

Idaho Falls, Idaho 83402

I, Russell Babcock, do hereby protest the application for changing the following water right within Butte County: Right Nos. 34-7179, 34-2330B, 34-7080B, 34-7121A, 34-7121B2, 34-7092, 34-7071, 34-12376, 34-13840, 34-13842.

And I protest the new point of diversion in SE NESE Sec. 29 T5N R 26 E for 5 CFS and drilling of a new well in the fore mentioned location filed by Telford Lands LLC C/O Mike Telford 1450 W HWY 24 Paul, Idaho 83347

For the following reasons

- There are too many wells in this area.
- There needs to be a study done on how it will effect the other wells already here.

Russell Babcock
Rt 1 Box 14
Moore ID 83255

Received 3/22/10 receipt # E035665

EXHIBIT P17

Director of Idaho Department of Water Resources

Eastern region

900 N Skyline Dr. Ste A

Idaho Falls, Idaho 83402

RECEIVED
MAR 18 2010
Department of Water Resources
Eastern Region

PO Box 14, Moore, ID 83255

Receipt

I Brenton H. Babcock do hereby protest the application for changing the following water right within Butte County: Right Nos. 34-7179, 34-2330B,

#E035655

34-7080B, 34-7121A, 34-7121B2, 34-7092, 34-7071, 34-12376, 34-13840,

34-13842.

And I protest the new point of diversion in SE NESE Sec. 29 T5N R 26 E for 5 CFS and drilling of ^{2nd} new well in the fore mentioned location filed by Telford Lands LLC C/O Mike Telford 1450 W HWY 24 Paul, Idaho 83347

For the following reasons

It will have adverse effect on our house well and our irrigatory well. and will also effect other wells in the vicinity

There are house wells that have been dried up by an irrigating well close by.

Can also effect the city of Moore wells.

This well is not in the best interests of the community there are already too many irrigating wells and the water being taken out of the valley

All these big wells are lowering the groundwater level.

Mr Telford should drill his well on the land where he plans to use it. Brenton H. Babcock D... 1-11-12 / 11

ESTIMATING WATER BUDGET IN A REGIONAL AQUIFER USING HSPF-MODFLOW INTEGRATED MODEL

Ahmed Said,¹ David K. Stevens,² and Gerald Schlke³

ABSTRACT: Integrated water resources management is important, especially in watersheds where substantial interactions exist between the ground and surface water sources. It necessitates the need for reliable estimates of an overall basin water budget and reliable estimates on hydrologic fluctuations between ground water and surface water sources. The objectives of this study were to estimate the total water budget and to simulate the effects of the management of water in the Big Lost River Basin in Idaho. The study used the FIPR Hydrological Model (FHM). FHM is a hydrological model developed by the University of South Florida for the Florida Institute of Phosphate Research (FIPR). It is an integrated model that simulates the full water budget of the surface and ground water systems. It has two public domain components: Hydrological Simulation Program – FORTRAN (HSPF) and MODFLOW. This study quantified the hydrologic fluxes between ground water and surface water and determined a comprehensive and accurate water budget for the Big Lost River. The study showed that surface water and ground water in the Big Lost River are hydrologically connected to a large degree and, therefore, should be managed simultaneously using an integrated management process. The study is useful in developing and calculating the annual water

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² Professor, Civil and Environmental Department, Utah State University, Logan, UT 84322-4110, e-mail: david.stevens@usu.edu

³ Advisory Scientist/Engineer, Integrated Environmental Analysis Department, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho 83415-2213, email: gse@inel.gov

budget in the Big Lost River, and this process should be applicable to estimating water budget in other basins.

(KEY TERMS: watershed modeling, Big Lost River; Snake River; Idaho; surface water; ground water.)

INTRODUCTION

In water resources management, quantifying the influence of ground water withdrawals on stream flows is an important component of water budget development and water rights adjudication (Kollet et al., 2002). In order to understand this influence, the natural hydrologic conditions and interaction should be quantified as well as the anthropologic impacts on the system. Ground water pumping can cause reductions in stream flow and lower water levels, affecting the ecology and wildlife of an area and reducing water available for senior water rights. Some of the surface water infiltrates into ground water. As a result, surface water and ground water should be studied simultaneously taking into account all these factors.

Integrated surface water and ground water models can be used to estimate current and future water budgets for a basin. However, a stand-alone surface water model or a ground water model cannot be used alone for long-term predictive simulations where the interactions between surface water and ground water are significant.

The advantage of integrating surface water and ground water models is that they can derive recharge and evaporation from surface water and ground water based on a detailed quantitative procedure. The integrated approach simulates the entire hydrologic

cycle including the subsurface portion. The processes that control net recharge to the system, such as precipitation, interception storage, runoff, evaporation, and evapotranspiration (ET), are accounted for in a quantitative and interdependent fashion.

There are a number of integrated models have been developed in the past 10 to 20 years including, MIKE SHE, HMS, SWATMOD, MODBRANCH, and FHM. MIKE SHE and HMS link ground and surface water components created as part of a unified model development process while SWATMOD, MODBRANCH, and FHM were created by linking previously developed surface water and groundwater models (CDM, 2001). MIKE SHE is used to simulate flow and transport of solutes and sediments in both surface water and groundwater (DHI, 1999). The Hydrologic Model System (HMS) was developed based on the BSHM (Basin-Scale Hydrologic Model) (Yu and Schwartz, 1998). SWATMOD links the SWAT model with the MODFLOW. SWAT is a watershed-scale model used to predict water, chemical, and sediment movement in large basins (Sophocleous et al., 1999). A limitation in this is the inability to model the unsaturated zone beyond the root zone. Therefore percolation (recharge) is applied directly to the groundwater table. MODBRANCH links the one-dimensional model of unsteady flow in open-channel networks (BRANCH) to MODFLOW. MODBRANCH simulates the interaction between streamflow and subsurface flow in areas with dynamic, hydraulically connected groundwater and surface water systems coupled at the stream/aquifer interface (Swain and Wexler, 1993).

FHM model was chosen for this study because it utilizes widely used models for performing water flow calculations and the model is public domain software (Ross et al., 1997). The objectives of this paper are to understand and simulate the hydrologic system

using the FHM integrating model and to estimate the total water budget in the Big Lost River Basin, in Idaho, and provide the management with the foundation for future decisions that can be made for better conjunctive use of water.

BIG LOST RIVER BASIN

The Big Lost River drains about 3,730 km² (1,440 mi²) and is a major tributary to the Snake River Plain aquifer (Figure 1). Mackay Dam, the only artificial storage in the basin, was completed in 1917, and it is the major artificial water control on the Big Lost River. The mean altitude of the valley is about 1,829 m (6,000 ft) and average precipitation is about 300 mm/year (12 in/yr) and it is approximately evenly distributed throughout the year.

Until 1964, the water table in most of the Big Lost regional aquifer was only a short distance, less than 3 m, below the surface (Mundorff et al., 1964). The Big Lost River flows through the valley until Arco where it enters the Eastern Snake River Plain, flows to its terminus, or is lost via seepage to the Eastern Snake River Plain aquifer. The ground water in the aquifer flows through the valley and discharges to Eastern Snake River Plain aquifer directly.

The Big Lost River is a losing stream down-valley from the Howell Ranch gaging station, and all tributaries lose a large part of their flow in the alluvial fans at their mouths or in the alluvial deposits of the main valley before reaching the Big Lost River. The Big Lost River recharges and percolates into the Snake River Plain aquifer near Arco and

terminates in playas, sinks, and spreading areas at the Idaho National Engineering and Environmental Laboratory (INEEL) as shown in Figure 1.

Precipitation

Precipitation time series is the main input for surface water modeling. The average precipitation is about 300 mm/year (12 in/year) and it is approximately evenly distributed throughout the year. Precipitation for the year 2000 was obtained from NOAA, 2001.

Evapotranspiration

The method selected for this study is the empirical equation of Jensen and Haise (1963). This method has been shown to be reliable for arid and semiarid Intermountain West (Jensen and Haise, 1963; Robb, 1966). This method is based on solar radiation and similar to the Penman-Monteith method without a requirement for the wind velocity factor. The general equation is as follow:

$$ET_p = \left[0.245 \times 10^{-4} \times R_s \times ((0.025 \times T_a) + 0.08) \right] \quad (1)$$

where:

ET_p = monthly mean of daily potential evapotranspiration (mm/day),

R_s = monthly mean of daily global (total) solar radiation ($\text{kJ}/\text{m}^2/\text{day}$), and

T_a = monthly mean of daily air temperature ($^{\circ}\text{C}$).

Since this method is based on monthly mean values for daily solar radiation and temperature, therefore, it can be applied to any time period on the basis of daily values.

Surface Water Flow

The estimated annual water yield of the Big Lost River basin is 58,000 hectare-meters (470,000 acre-ft), while an average of 6,660 hectare-meters (54,000 acre-ft) are lost as surface water discharged from the valley to the Snake River Plain at Arco, 38,000 hectare-meters (308,000 acre-ft) are discharged as subsurface flow, and 13,450 hectare-meters (109,000 acre-ft) are lost by evapotranspiration, annually. There are 8,758 hectares (21,642 acres) irrigated land above Mackay Dam and 20,147 hectares (49,785 acres) irrigated land below Mackay Dam.

Ground Water Flow

About 104 hectare-meters/day (424 acre-ft/day) or 65% of the total water yield of the basin *discharges* ground water past Arco (Crosthwaite et al., 1970). Pumping from wells would serve to decrease the quantity of water leaving the basin. In 1970, the water table in the Big Lost River regional aquifer is less than 15 m but near the river it may be less than 3 m below the surface. The ground water gradient varies greatly from season to season, from three to hundreds of meters per kilometers at different places in the valley. In the outer reaches of the valley, high on the alluvial fans, water might be found at more

than 100 m, and in some places, especially in the lower end of the valley, some of the water-bearing zones are more than 200 m below the surface.

In 1995, the altitude of the water table in the Snake River Plain aquifer at the INEEL was about 1,396 m (4,580 ft) above mean sea level in the northern part and about 1,350 m (4,420 ft) above mean sea level in the southwestern part (Bartholomay, 1995). In the eastern plain of the Snake River Plain, a thick sequence of thin-layered basalt flows yields large volumes of water to wells. A significant portion of the ground water moves through the upper 244 m (800 ft) of saturated rocks. Wells in Butte City penetrate a section consisting of approximately equal thickness of basalt and sedimentary materials with a bottom layer of sand and gravel extending from 137 to 152 m (450 to 500 ft).

Bennett (1990) reported that depth to the regional aquifer below the river channel ranges from about 207 m (680 ft) at the western boundary of the INEEL (see Figure 1) to about 64 m (210 ft) at Playa 4. Stream flow is not affected by regional changes in the aquifer because of the thickness of the unsaturated zone.

Surface and Ground Water Interaction

Surface and ground water are known to be hydraulically inter-connected throughout the basin except at INEEL. A distinctive feature of the Big Lost River Basin is the large interchange of water from surface streams into the ground and from the ground into the surface streams (Crosthwaite et al., 1970). There are few comprehensive studies addressing the interaction between surface water and ground water in the Big Lost River (Mundorff et al., 1964; Crosthwaite et al., 1970). After Crosthwaite et al. (1970),

intensive agricultural development in the valley was occurred based on their recommendation. Most development was in the lower part of the basin using the ground water. Since then, the interaction of ground and surface water has been shown to be a significant concern in the valley. There is a strong need to address this issue using new technology to update the old studies and provide the concern people with the latest situation of water resources in the valley after the fact.

METHODS

This study uses an integrated hydrologic surface water and ground water model called FHM, a hydrological model developed by the University of South Florida for the Florida Institute of Phosphate Research (FIPR). This model simulates the full water budget of the surface and ground water systems. It is made of two public domain components: HSPF and MODFLOW models. HSPF, supported by the U.S. EPA and U.S. Geological Survey, simulates the surface water system and hydrologic water cycle (Johanson et al., 1984). HSPF was developed to simulate the hydrologic and water quality processes on pervious and impervious land surfaces, and transport within streams and reservoirs. MODFLOW, supported by the USGS, computes aquifer flows and storages (McDonald and Harbaugh, 1988). MODFLOW was developed to simulate ground water flow in three dimensions using a block-centered, finite-difference approach. It provides for simulation of unconfined and confined ground water flow conditions. The model includes a stream package, which is used in conjunction with the HSPF stream reach feature to include base flow dependent on stream stage. FHM first uses HSPF to

calculate runoff, infiltration, recharge, surface evapotranspiration and storage on an hourly basis. The code then uses MODFLOW to calculate groundwater flow for a daily time step. This sequence is repeated until the simulation time is completed (Ross et al., 1997).

The procedure in this study is as follows:

1. Data collection: HSPF and MODFLOW take large amount of data to apply it to a real site (i.e., a complete HSPF data set with meteorologic input files and a complete ground water data set compiled from hydrogeologic data).
2. Geographic Information System (GIS) tools are useful to get Digital Elevation Model (DEM), slope, soils, and land use. GIS is also used as a pre- and post-processor for the aquifer characteristics, such as transmissivity, wells, rivers, and ground water contours.
3. Pre-calibration of the surface water and ground water applications is needed prior to performing comprehensive integrated simulations. Initial static head will be obtained from MODFLOW outputs of steady-state simulation. Recharge to the aquifer will be obtained from HSPF output.
4. HSPF is applied to get recharge rates and total surface evapotranspiration. This application is followed by MODFLOW application to the unconfined aquifer in a steady-state ground water flow using the average conditions of the calendar year 2000 to get the initial condition for the final application of confined/unconfined transient flow with variable transmissivity.
5. Model calibration for the transient simulation includes the observed and simulated ground water levels, base flow, and surface runoff.

Base Flow and Surface Runoff Separation

Base flow separation can be used to evaluate model performance. A comparison between the separated and simulated base flow will be presented later in this paper. Base flow was separated with the USGS public domain hydrograph separation software HYSEP (Sloto and Crouse, 1996). Figure 2 shows an example of the base flow and surface runoff separation for the stations number 13120500 (Howell Ranch near Chilly, Idaho). The HYSEP program uses three methods to separate the base flow and surface runoff components of the stream flow hydrograph-fixed interval, sliding interval, and local minimum. These methods can be described conceptually as three different algorithms to systematically draw connecting lines between the low points of the stream flow hydrograph. The sequence of these connecting lines defines the base flow hydrograph. Using of these methods requires the number of days after which surface runoff ceases, N . This value is obtained from an empirical relation:

$$N = A^{0.2} \quad (2)$$

where A is the drainage area in square miles. The interval $2N$ used for hydrograph separation is the odd integer between 3 and 11 nearest to $2N$. The hydrograph separation begins one interval ($2N$ days) prior to the start of the date selected for the start of the separation and ends one interval ($2N$ days) after the end of the selected date to improve accuracy at the beginning and end of the separation.

In this study, the local minimum method was used. This method checks each day to determine if it is the lowest discharge in one-half intervals minus one ($0.5(2N-1)$) days before and after the day being considered. If it is, then it is a local minimum and is connected by straight lines to adjacent local minimums. An interval of 9 days is used in this study for the hydrograph separation.

Figure 2 indicates that most of the stream flow is dominated by base flow except for the period May-July where surface runoff is at its maximum due to snow melting. However, this base flow is relatively large and the actual base flow need to be measured. Although flow in the main stem of Big Lost River is perennial from its head to a few kilometers below Howell Ranch, large volumes of water percolate from the river channel into the ground in the reach from Howell Ranch to near the upstream end of Mackay Reservoir (Crosthwaite et al., 1970).

Surface Water Simulation

The Big Lost River watershed consists of 12 sub-basins range in area from 5.2 to 655 km² (2 to 253 mile²). Figure 3 shows the sub-sub-basins and their numbers that have been used in this study. Each sub-basin is normally comprised of many unique areas, which represent uniform characteristics, such as soil type and vegetation.

The number of reaches is chosen as 10, which includes the main stem and the main tributaries of the Big Lost River (Figure 4). Estimation of the sub-basin parameters used by HSPF is obtained from HSPF manual (Bicknell et al., 1997), FHM Manual (Ross et al., 1997), U.S. EPA (1999), and GIS data.

The soils of the Big Lost River watershed are formed from river alluvium. They have moderate to moderately rapid permeability and very low or low water holding capacity of 17 to 106 mm (0.65 to 4.16 inches). Approximately 70% of the basin consists of grasslands and forest. The slope and elevation were taken from the GIS files of DEM and slope driven using the GIS DEM files of and slope driven using the IDWR GIS database (IDWR, 2003).

Ground Water Simulation

Transmissivity and Storage Coefficient. The ground water domain uses a grid that is discretized into 35 rows and 50 columns with a uniform cell size of 867 m in each direction (Figure 5). It is assumed one layer of 244 m depth. Ten MODFLOW packages were used: Basic, Output Control Option, Block Centered Flow, River, Recharge, Well, Evapotranspiration, General Head Boundary, Snow, and Preconditioned Conjugate Gradient. The solution starts with an unconfined steady-state aquifer with constant transmissivity to get the initial ground water elevations. Next, a transient flow solution was performed but with variable transmissivity. The transmissivity was examined during simulation and model calibration.

Transmissivity in the Big Lost River valley commonly exceeds $9,290 \text{ m}^2/\text{day}$ ($100,000 \text{ ft}^2/\text{day}$) and, in places, $92,900 \text{ m}^2/\text{day}$ ($1 \text{ M ft}^2/\text{day}$). The average hydraulic gradient for the valley is about 3.41 m/km (18 ft/mi), the width of the saturated alluvial deposits is about 5.6 km (Whitehead, 1992). Bassick and Jones (1992) stated that the Theis type-curve analysis indicates that aquifer transmissivity ranged in the lower part of

the valley from 5,670 to 30,700 m²/day (61,000 to 330,000 ft²/d); values of 12,000 to 20,440 m²/day (129,166 to 220,014 ft²/d) were most probable. Jacob's method yielded transmissivity values of 5,667 to 16,723 m²/day (61,000 to 180,000 ft²/d).

The dimensionless storage coefficient is the change in aquifer water volume by gravity per unit surface area of the aquifer per unit water table elevation. As in this study, the storage coefficient is the same as the specific yield.

The storage coefficient ranges from (0.0001 to 0.02); the value of about 0.001 is most probable. Jacob's method yielded storage coefficients of 0.0006 and 0.001 (Bassick and Jones, 1992).

In this study, we have the following hypotheses:

1. The river loses (leaks) most of its ground water beneath the INEEL.
2. Transmissivity at INEEL is much higher than transmissivity in the rest of the basin.
3. Storage coefficient at INEEL is about double elsewhere in the watershed.

It is assumed that the average depth of the aquifer is 244 m. The values for transmissivity, hydraulic conductivity, and storage coefficient are shown in Table 1.

Leakage and Conductance. Leakage from river bottom is controlled by river conductance, which is a numerical parameter that represents the resistance to flow between the surface water body and the ground water. The conductance for the streams of the Big Lost River in m²/day was calculated as:

$$C = \frac{KLW}{M} \quad (3)$$

where:

L = the length of a reach through a cell (cell size spacing 867 m),

W = the width of the river in m,

M = the thickness of a river bed in m, and

K = the hydraulic conductivity of the riverbed material in m/second.

The width, W ; the thickness, M ; and the hydraulic conductivity, K were obtained from the Idaho Department of Water Resources (IDWR) field measurements.

The riverbed materials range from silt clay to very coarse pebble but most of them are coarse sand and pebble. The predominant gravels in the river bottom are quartzite and limestone. The majorities of river bottom soils are shallow, 254 to 508 mm (10 to 20 inches), to sand and gravel (Jensen, 1982).

The river boundary allows the water to be exchanged between the river and the aquifer. However, the nature of the Big Lost River as a losing stream and according to the hypothesis that the river leaks most of its water beneath the INEEL, a General Head Boundary (GHB) was installed before the boundary and where most of the water is lost. The leakage between these two aquifers was calculated using the following equations (Ross et al., 1997):

$$L_g = L(H_e - H_a) \quad (4)$$

$$L = K/M \quad (5)$$

where:

L_g = leakage in m/day,

L = leakage in day⁻¹

H_e, H_a	= heads in the Big Lost River and the Eastern Snake River aquifers in m
K	= hydraulic conductivity of the Big Lost River aquifer in m/day
M	= thickness of confined bed in m.

Pumping Wells. Another important input is the ground water pumping rates for the existing wells. Based on data provided by the Idaho Department of Water Resources Adjudication Bureau, there are 695 stations that have data of water level. Forty-nine of them that have long time series data are chosen for analysis. The data is not distributed evenly, some years have 40 to 80 records per year, but for some other years, there are only 1 to 7 records per year, especially for the recent 10 to 20 years. Pumping for irrigation was estimated from electrical power records using the relation described by Bigelow et al., (1987). Ground water pumping ranged from 4.4 to 252.4 Liter/sec in the calendar year 2000.

Water budget

ZONEBUDGET is a program that uses flow results from the MODFLOW to construct the water budgets of individual zones or river reaches (Harbaugh, 1990). The main items of the flow budget are the base flow, seepage, and recharge for every sub-basins. These items are used to construct the water budget of the basin while the base flow obtained from MODFLOW and surface runoff obtained from HSPF are used for model calibration.

MODEL CALIBRATION

Model calibration was performed in three steps. In each step, model parameters calibrated simultaneously. The first and second steps were made for the GHB and ground water levels, respectively to compare the levels and directions of ground water flows from the Big Lost River aquifer to the Snake River Plain aquifer. The third step was made for the stream flows to compare the observed and simulated stream flows in different surface water stations. These steps were repeated in sequence until the model calibration is completed.

GHB Calibration

The GHB was used to adjust the ground water levels and directions as shown earlier in Figure 5. The observed ground water levels shows that the levels in the wells in the downstream end of the watershed are not the lowest one. Table 2 shows the well numbers, well locations, and the measured and simulated values. Although wells 18 are downstream of wells 14 and 15, it shows higher ground water elevations. This indicates that the water presumably moves from the Big Lost River aquifer downward to the Snake River Plain through the GHB and then the water move southwestward. This also indicates that the location of the GHB is not at the downstream boundary of the basin and the location shown in Figure 5 is the right location. Accordingly, hypothesis 1 is valid and the river leaks beneath the INEEL site.

Ground Water Level Calibration

Figure 6 and Table 2 show a comparison between the observed and simulated head with correlation coefficient of 0.97 and mean absolute error (MAE) of 20 m. The locations of these wells were downloaded from the USGS online database (USGS, 2003a) as shown in Table 2. Since the MODFLOW solution was based on a confined/unconfined aquifer with variable transmissivity, the transmissivity and storage coefficient are the major parameters that can be adjusted during the simulation. The resulting ground water levels at the downstream part of the basin are in the range of 1,300 – 1,500 m as mentioned in Bartholomy (1995). This indicates that hypotheses 2 and 3 are valid.

Stream Flow Calibration

In the second step, sub-basins numbers 1 and 3 (North/East Fork zone and Mackay sub-basin) were chosen to calibrate the model with respect to the daily stream flows. Data for these stations were downloaded from USGS online database (USGS, 2003b).

The observed and simulated stream flows are shown in Figure 7 for Howell Ranch station. This figure shows that the simulation is matching, in time and volume, the general trend of the stream flows with small discrepancies. Another comparison between separated and simulated base flow will be presented later in this study. However, this comparison did not used to calibrate the model due to the uncertainty in separated base flow.

RESULTS AND DISCUSSION

Initial and transient conditions

The head results of the steady-state condition are used to develop the initial conditions for the transient ground water flow. The transient simulation represents the conditions present during the year 2000. The ground water elevations range from 1,356 to 2,255 m (4,450 to 7,400 ft) above mean sea level. The recharge and ET used were derived from the surface water simulation.

The surface water simulation computes the monthly output basin water balance. These water balances were used to develop an array for each stress period for both the recharge and ET packages. The monthly recharge rates for the sub-basins varied from a low of 0.6 to 26.7 mm (0.02 inches to 1.05 inches). Total recharge for the year was about 1,468 mm (57.8 inches). The monthly ET rate (remaining potential ET) was about 3.8 mm (0.15 inch). Total ET for the year was 374 mm (14.72 inches).

Surface Water Budget

Table 3 shows that the lower part of the watershed (Arco, Butte, and INEEL sub-basins) has negative net recharge, which indicates that pumping from the ground water would lower the heads with time.

The following equation was used to formulate the water budget estimation. Because total ET includes ground water ET, net recharge was used in this equation (Ross et al., 1997).

Precipitation ? Unsaturated Storage = Total ET ? Net Recharge ? Runoff, or

Net Recharge ? Unsaturated Storage = Precipitation ? Total ET ? Runoff (6)

Integrated Water Budget

The average recharge for the whole watershed was found as 48.37 m³/sec, and the maximum recharge occurs in May as shown in Figure 8. At the beginning of the year, both recharge and base flow were small. However, in the March-May time frame, the recharge was greater than the base flow, which indicates that there was positive net recharge to the aquifer. The recharge increased in May when the snow melted and that increased the base flow after the aquifer got enough water to support the streams. With the increased amount of water used in irrigation from May to September, the amount of recharge started to decrease but there are still amounts of base flow that support the end of the irrigation season. Table 4 shows the total water budget for the individual zones. However, a comparison between base flow separated from surface runoff using HYSEP as shown earlier in Figure 2 and simulated base flow is shown in Figure 9. The simulated base flow, in general, is less than the separated values, which strengthen the conclusion that separated base flow is relatively high. However, the separated base flow needs to be measured to validate the methods used in the HYSEP program.

The North/East Fork sub-basin has the maximum recharge while the Butte sub-basin has the minimum recharge (Figure 10). Maximum base flow occurs in May, and a major part of this amount is returned to the streams as base flow and is calculated as 36.48 m³/sec, while a minor part (6.25 m³/sec) was used as withdrawal by wells close to

the seepage from streams ($5.25 \text{ m}^3/\text{sec}$). The ground water ET is the difference between the total available ET 377.7 mm (14.87 in), and the potential ET, 373.9 mm (14.72 in) over the entire watershed with its area of $3,729.6 \text{ km}^2$ (1440 mi^2). This amount was estimated as $0.45 \text{ m}^3/\text{sec}$ ($15.91 \text{ ft}^3/\text{sec}$). An amount of $10.44 \text{ m}^3/\text{sec}$ ($48.37 + 5.25 - 6.25 - 36.48 - 0.45$) left the basin to the ground water and compares with the $12 \text{ m}^3/\text{sec}$ that was mentioned by Crosthwaite et al. (1970).

From the water budget, there are many management challenges that look practical. First, no excessive pumping should be allowed in Arco and Butte sub-basins. However, further development can be allowed in other sub-basins, especially the Thousand Springs, North/East Forks, and Antelope sub-basins. Second, the $10.44 \text{ m}^3/\text{sec}$ that left the system to the underground past Arco should be captured. This might require ground water surveys to determine the most suitable areas that can be developed without negative impacts on the already developed areas or the areas that are already depleted.

Another challenge is the amount that goes to the ground water by seepage from river bottoms, which is calculated as $5.25 \text{ m}^3/\text{sec}$, which is approximately equal to the amount used by all the wells in the watershed ($6.25 \text{ m}^3/\text{sec}$). In addition, some water remains after the irrigation season, especially in September and October. This amount can be recharged to the aquifer in carefully selected locations according to the ground water survey.

CONCLUSIONS

Integrating of surface water and ground water in management is beneficial, especially where a strong interaction occurs between the two sources. This integration estimates a clear and comprehensive water resources budget that could make water management more efficient. Using the FHM to integrate the HSPF and MODFLOW with triple calibration can help predict the ground water elevations efficiently and estimate the different components of the water budget.

Knowing the amounts of recharge, seepage, and base flow is necessary to determine the component of water budget development and water rights adjudication. The Big Lost River has a large interchange of water from surface water sources into the ground and from the ground into the surface streams. Direct precipitation is the major source of recharge to the local aquifer of the Big Lost River. A significant amount of the ground water recharge, estimated at $48.37 \text{ m}^3/\text{sec}$, returns to surface water as base flow. This base flow is estimated at $36.48 \text{ m}^3/\text{sec}$ and has its peak in May through July while the recharge is achieving its maximum rate in May. The amount of ground water pumped by wells is estimated at $6.25 \text{ m}^3/\text{sec}$, and this amount is close to that lost by seepage, which is estimated at $5.25 \text{ m}^3/\text{sec}$. The North/East Forks zone has the maximum amount of recharge, while the Thousand Springs zone produces the maximum amount of base flow. The minimum recharge is in the Butte sub-basin, and this sub-basin along with the INEEL and Arco sub-basins have the minimum base flows within the valley. However, there is an amount of $10.44 \text{ m}^3/\text{sec}$ that leaves the basin and is lost and never returns to the system.

Determining the different components of the water budget benefits the integrating of management, however, it also provides some challenges. One of these challenges is

how to recover and use the amount of water lost through ground water, which is about double the amount of the ground water pumped by wells. Another challenge is how to reduce the seepage losses. Although part of the seepage is returned to the river as base flow, there might be some other part that is lost from the system and this may require a ground water survey to determine what places should be controlled to reduce losses from the river. In addition, artificial recharge of the aquifer in good water years will raise ground water levels, especially in the lower part of the basin. However, excessive ground water pumpage from the aquifer increases seepage losses from the river, therefore, some restrictions on wells in the lower part of the basin may need to be encouraged.

The results indicated that there are some sub-basins that need no more stresses, such as Arco and Butte, while some others can have more development potential if they can sustain viable crops/beneficial uses; these include: North/East Forks zone, Thousand Springs zone, and Antelope sub-basin.

Overall, the knowledge and understanding of water budgets can be used for better conjunctive use management. Conjunctive use of both surface and ground water provides the most efficient use of the Big Lost River water resources. This would provide a system that could draw heavily on the ground water during dry years. During wet years, the draft on ground water should be minimized and excess stream flow artificially recharged to the ground water aquifer. Only through this kind of exchange can use of all the water resources of the basin be optimized.

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Table 1. Transmissivity, Hydraulic Conductivity and Storage Coefficient.

Sub-basin	Transmissivity		Hydraulic Conductivity		Storage Coefficient
	m ² /day	ft ² /day	m/day	ft/day	
Butte sub-basin	37,160	400,000	46	500	0.15
INEEL sub-basin	92,903	1,000,000	116	1,250	0.25
The rest of the watershed	6,830	75,000	65	6	0.35

Table 2. Pumping Wells Numbers, Locations, and Measured and Simulated Levels

Index	Well Number	LAT	LONG	Measured (m)	Simulated (m)	Absolute Error
1	440649113565701	44.113529	-113.950039	1904	1915	11
2	435408113364001	43.901667	-113.611667	1826	1792	34
3	435313113272301	43.886849	-113.457236	1734	1737	3
4	434713113230601	43.786846	-113.385845	1662	1676	14
5	434436113193901	43.743235	-113.328342	1587	1579	8
6	433013113024201	43.503518	-113.045832	1606	1585	21
7	433748113234001	43.629902	-113.395289	1609	1573	36
8	433522113170303	43.589348	-113.285006	1378	1408	30
9	433121113115801	43.522269	-113.200123	1341	1381	40
10	433419112560201	43.571851	-112.934441	1398	1385	13
11	434515113222401	43.754068	-113.374178	1373	1387	14
12	432919113031501	43.488518	-113.054999	1381	1372	10
13	433522112582101	43.589440	-112.973468	1382	1372	10
14	433216112563301	43.537649	-112.943321	1362	1393	31
15	433928112545401	43.657684	-112.915831	1346	1384	37
16	433826112510701	43.640402	-112.852626	1396	1384	12
17	434334112463101	43.726019	-112.776105	1365	1393	28
18	434915112443901	43.820688	-112.745235	1398	1390	9
Mean Absolute Error (MAE)						20

Table 3. Surface Water Budget

Sub-Basin	Precipitation (mm)	Stream Flow (mm)	Base Flow (mm)	Runoff (mm)	Total ET (mm)	Net Recharge + Unsaturated Storage (mm)
North/East Fork	741.68	210.82	195.58	47.24	327.66	314.96
Thousand Springs	457.20	144.15	119.38	24.77	292.10	139.70
Mackay	373.38	97.97	91.80	6.17	304.80	60.96
Arco	274.32	5.94	5.00	0.97	297.18	-23.88
Butte	261.62	5.00	4.29	0.71	353.06	-91.44
INEEL	243.84	3.63	3.18	0.48	314.96	-71.12

Table 4. Surface and Ground Water Budget for the Year 2000

Sub-Basin	Precipitation	Runoff	Base Flow	Actual ET	Recharge	Stream Flow
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
1	734.06	13.08	40.64	342.90	93.93	53.59
2 East/North	800.10	18.87	31.24	347.98	75.44	50.04
3 Forks	652.78	24.49	14.0	350.52	100.30	33.53
4	741.68	1.42	45.3	271.78	87.55	51.05
5 Thousand	345.44	10.13	21.08	271.78	149.20	31.24
6 Springs	457.20	5.69	27.94	322.58	121.44	33.53
7	411.48	5.94	30.99	2740	124.23	36.83
8 Mackay	373.38	5.84	73.41	304.80	124.36	725
9 Antelope	487.68	3.00	103.89	322.58	116.21	106.68
10 Arco	274.32	0.61	6.35	297.18	98.78	6.86
11 Butte	261.62	0.58	4.16	353.06	82.12	4.73
12 INEEL	234.06	0.48	3.18	342.90	49.83	3.63

Figure Captions

Figure 1

Big Lost River Watershed Location

Figure 2

Monthly Stream Flow, Surface Runoff, and Base Flow at Howell Ranch

Figure 3

Sub-basins for the Big Lost River: sub-basins 1, 2, 3, and 4 form the North/East Fork Zone, sub-basin 5, 6, and 7 form Thousand Springs Zone

Figure 4

Big Lost River and its Tributaries

Figure 5

Model Discretization

Figure 6

Normal Plot with Reference Line for ground Water Levels

Figure 7

Observed and Simulated Stream Flows at Howell Ranch Station

Figure 8

Flow Distribution during the Year of 2000

Figure 9

Comparison between Observed and Simulated Base Flow

Figure 10

Water Budget for the Big Lost River for the Year 2000

Figure 1

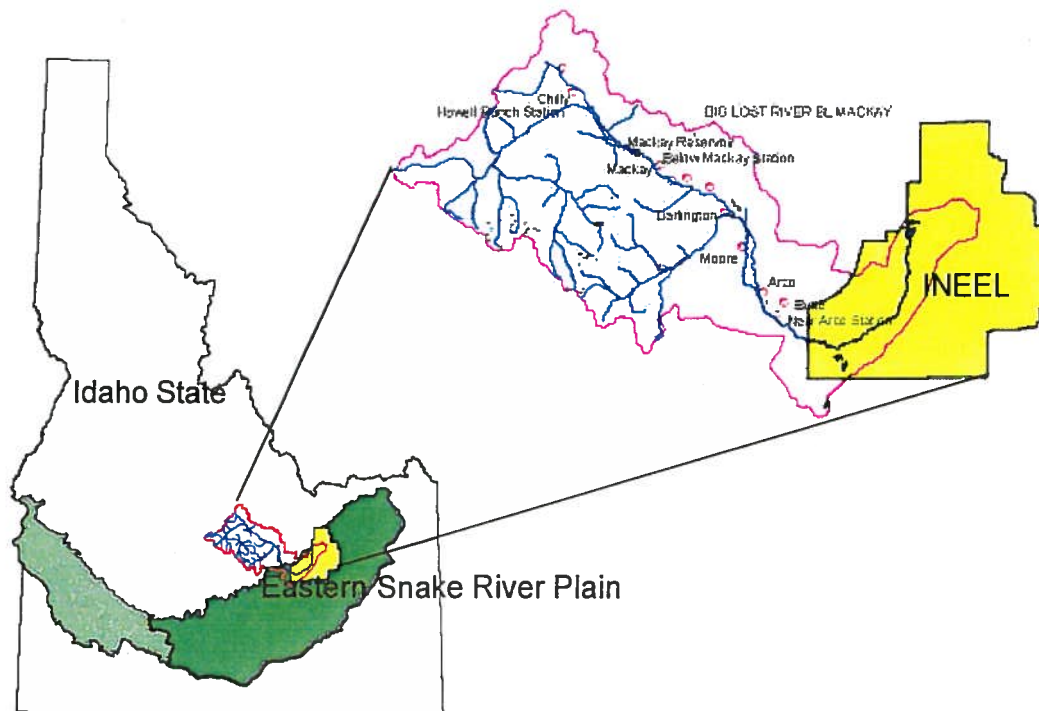


Figure 2

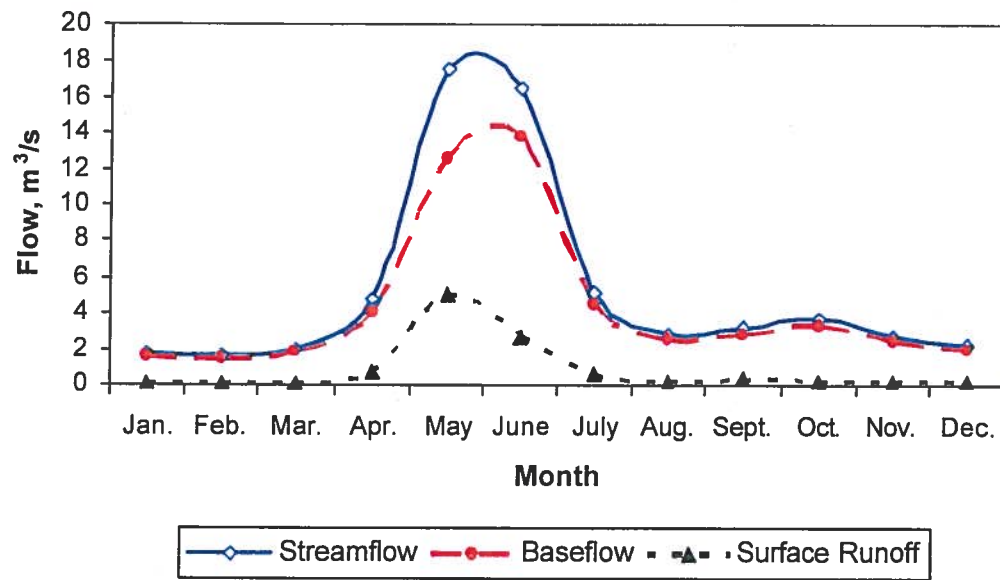


Figure 3

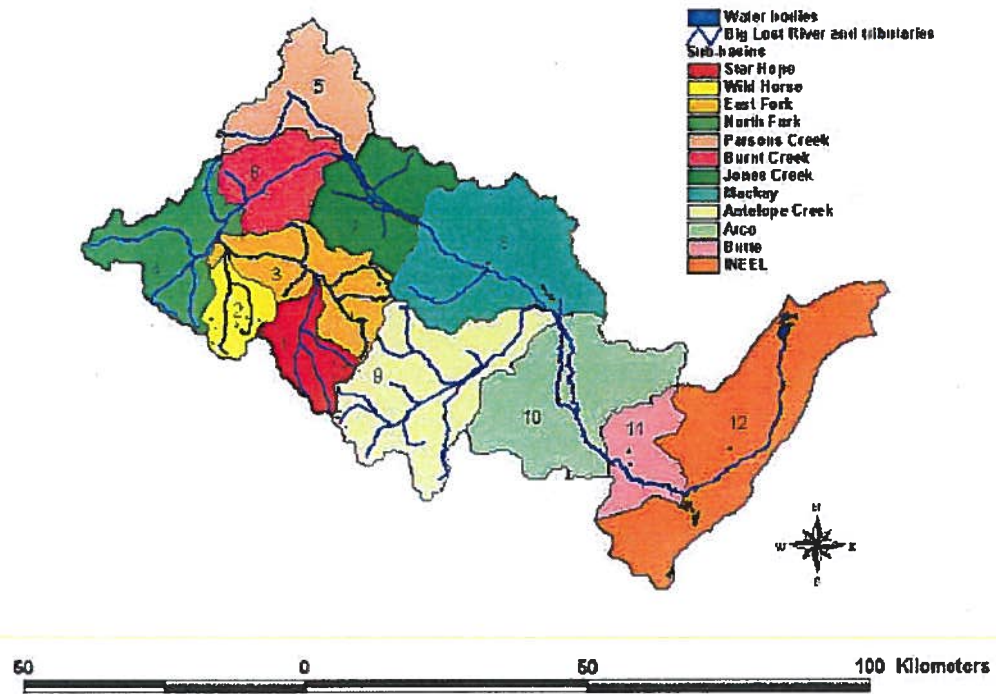


Figure 4

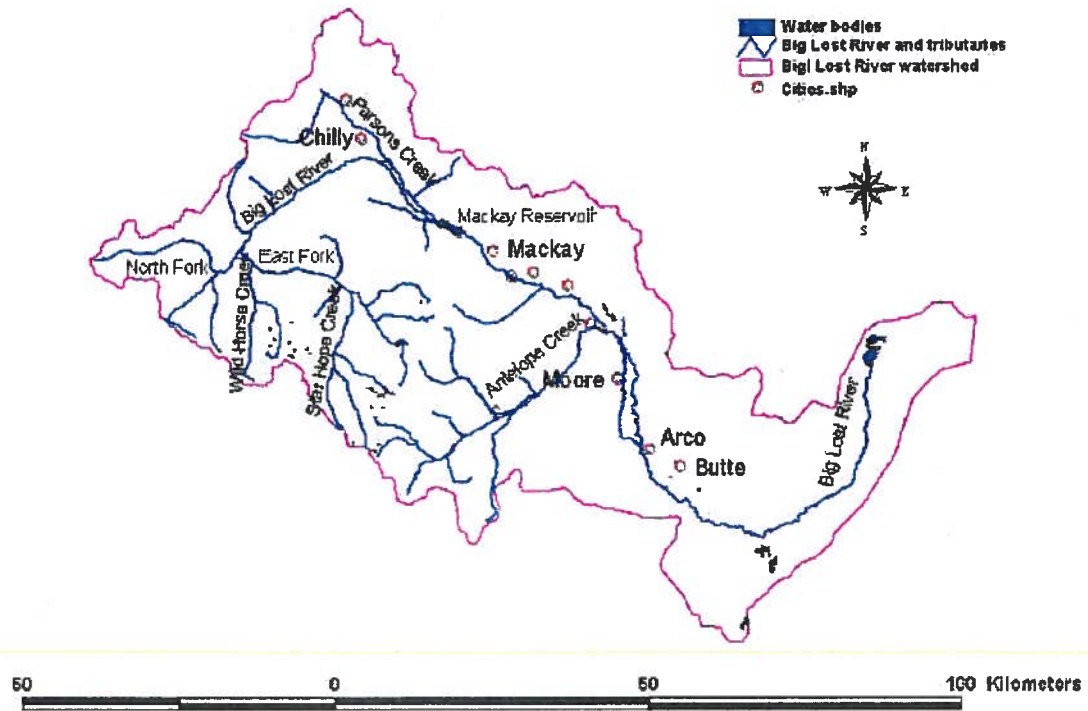


Figure 5

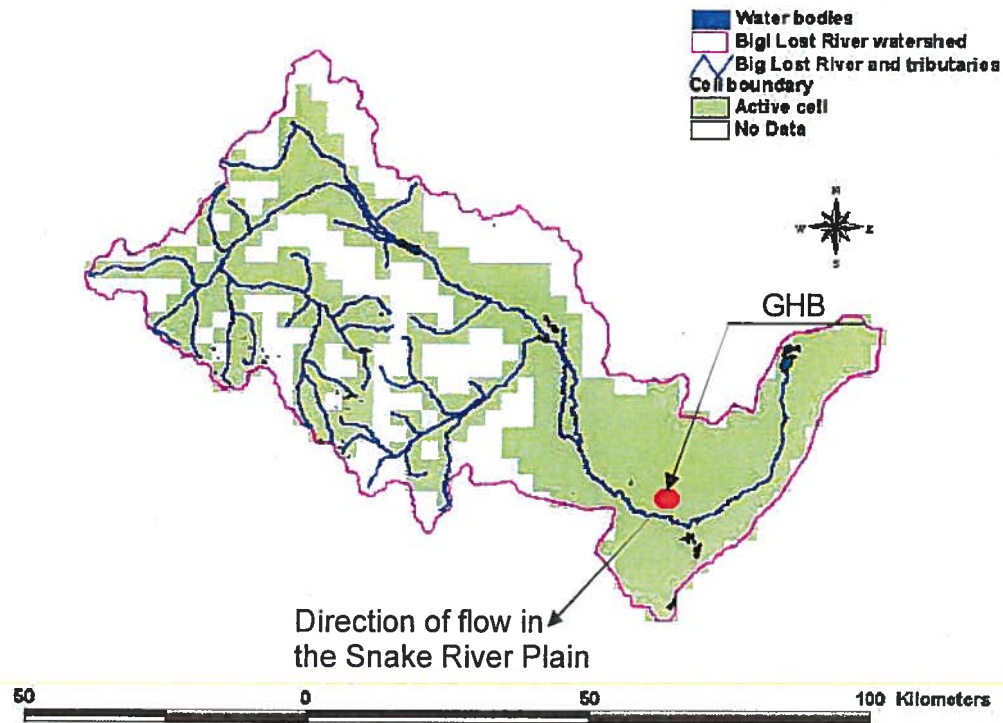


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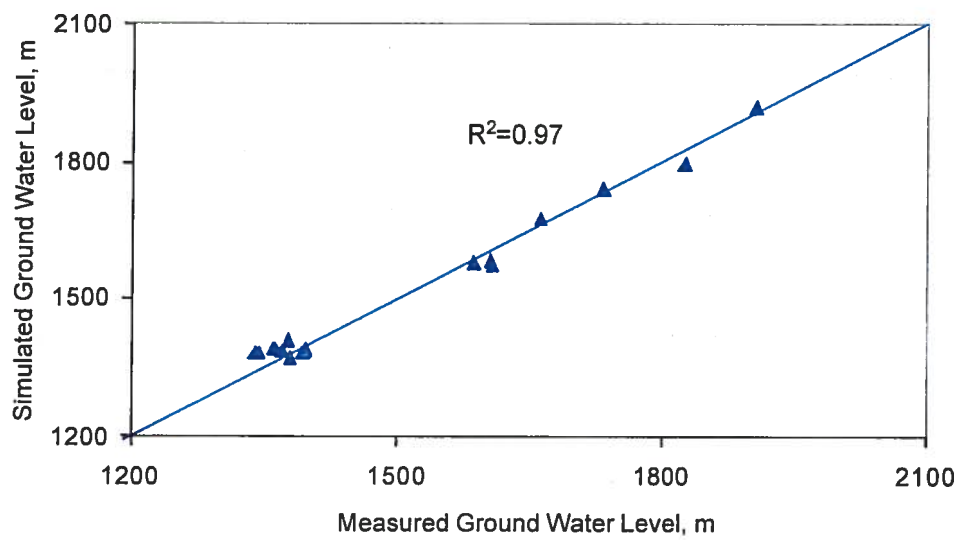


Figure 7

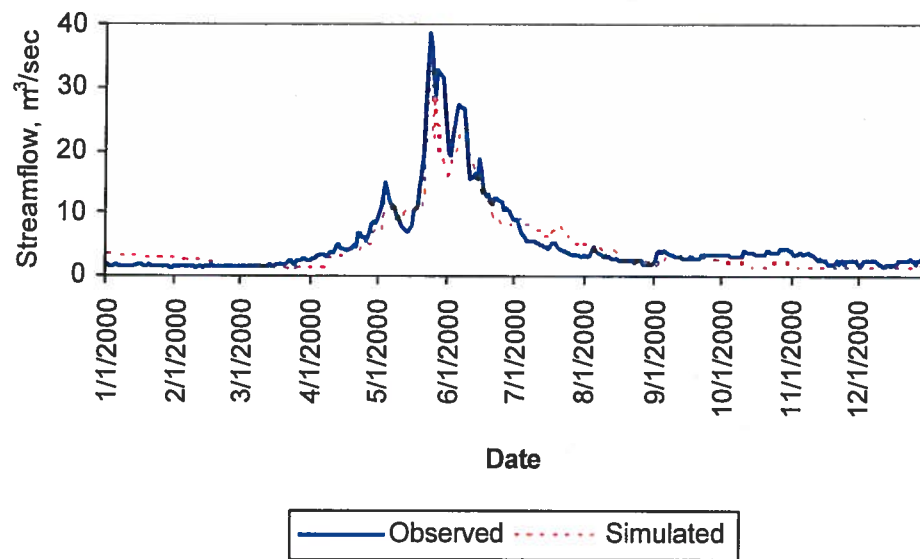


Figure 8

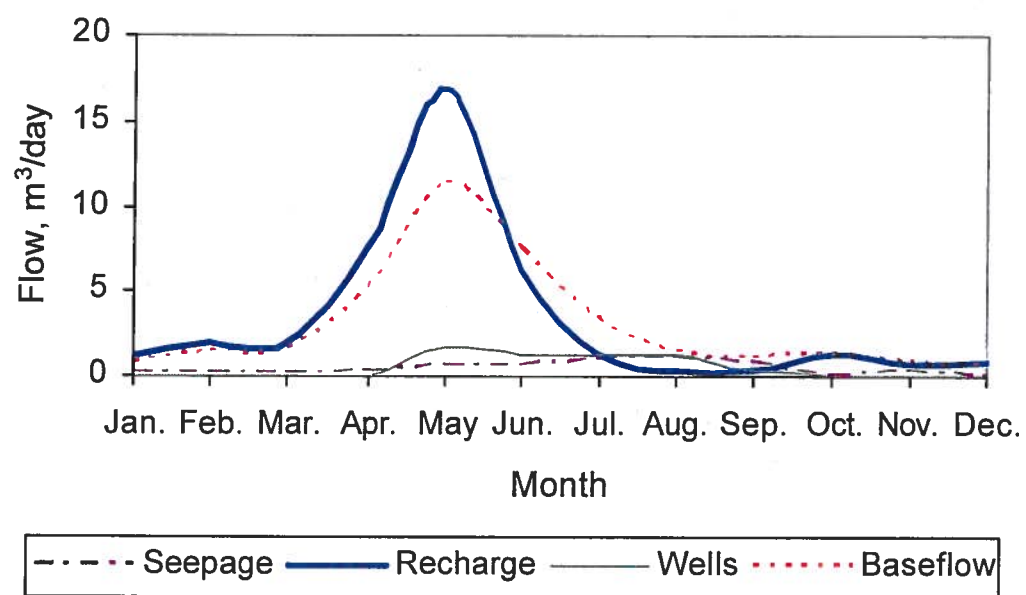


Figure 9

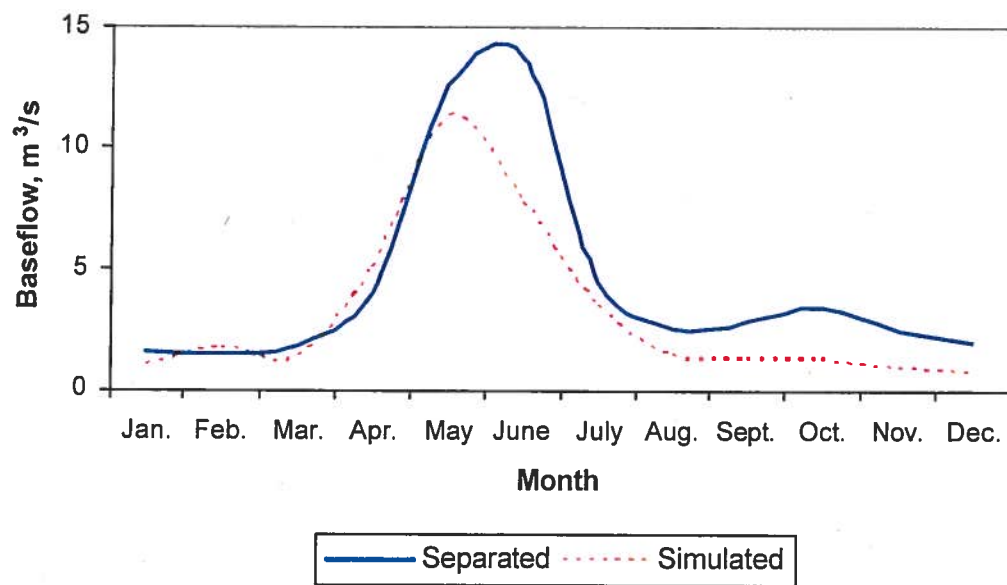


Figure 10

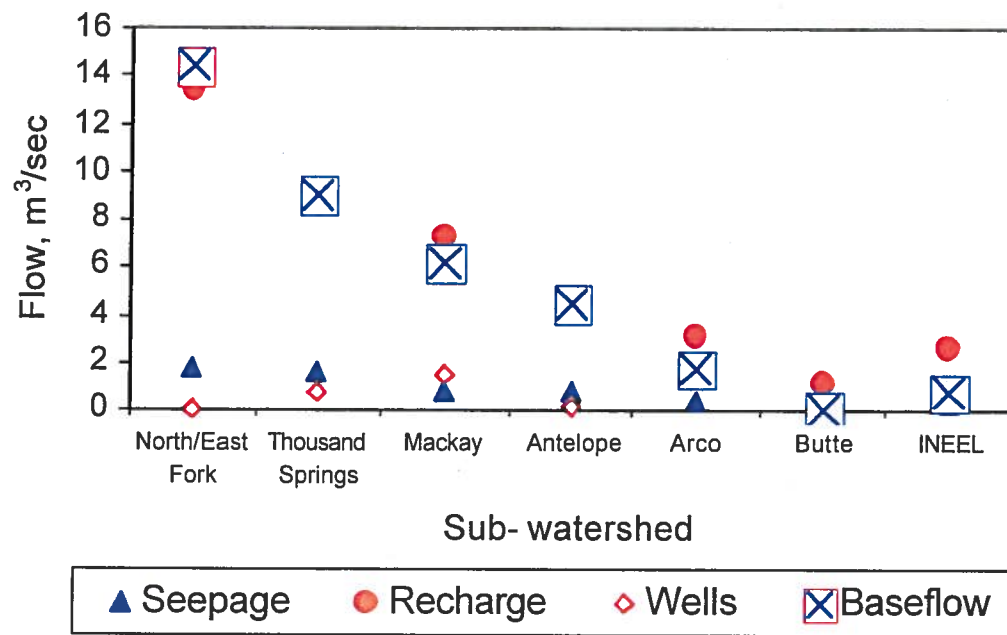


EXHIBIT P19

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EDUCATION

B.S. Geophysics with a Math Minor, Western Washington University, Bellingham, Washington, 1981,

M.S. Geological Engineering, Washington State University, Pullman, Washington, 1987

Ph.D. Hydrogeology (in Mining Engineering Department), University of Idaho, Moscow, Idaho, 2005

SUMMARY

Dr. Wood has extensive experience in water supply analysis, well design and construction, basic and applied ground water research, aquifer characterization, and ground water remediation during 28 years of professional practice. He has considerable experience directing large, multi-disciplinary teams to characterize, monitor, and remediate hazardous and/or radioactive waste sites and specialized experience in water flow in fractured rock, ground water and vadose zone hydrogeology, well design, aquifer testing, fire water wells and water management.

EMPLOYMENT HISTORY

CHIEF HYDROGEOLOGIST AND PRESIDENT, 1994 – PRESENT *CLEARWATER GEOSCIENCES, LLP*

President and founder of a consulting company supporting groundwater exploration, development and management in Southern Idaho and Western Wyoming. The company specializes in supporting the needs of small cities and communities in obtaining clean supplies of ground water and managing ground water as a resource.

RESEARCH HYDROGEOLOGIST, 1988 – PRESENT.....*BEA*

Lead research scientist for a large number of projects related to the study and understanding of groundwater flow and transport in the Snake River Plain Aquifer and Fractured Rock Vadose Zones. Major projects included: Advanced Conceptual Models for Unsaturated and Two-Phase Flow in Fractured Rock; OU 10-08 Sitewide Groundwater Model; Complex Systems Theory applied to Vadose Zone Transport; A Chaotic-Dynamical Conceptual Model of Fluid Flow and Contaminant Transport in a Fractured Vadose Zone; Analog Site for Fracture Rock Characterization; Large Scale Aquifer Pumping and Infiltration Tests.

AFFILIATE FACULTY, 1989 – 1999 *UNIVERSITY OF IDAHO*

Instructor of a Senior/Graduate level courses in ground water hydrology.

PETROLEUM GEOPHYSICIST, 1981 - 1985 *CHEVRON U.S.A.*

Provided recommendations on prospects for lease sale bidding based on structural and stratigraphic interpretation of seismic, magnetic and gravity data. Several prospects were purchased for a total exceeding two million dollars.

PUBLICATIONS AND REPORTS

Dr. Wood has written and lectured extensively on the subjects of hydrology, geophysics and the Snake River Plain Aquifer. He has authored numerous research papers on the flow of fluids in fractured rock and has written numerous water reports for projects in Idaho. A partial list of related water supply projects is provided below:

City of Idaho Fall Wells 15B, 13B and 18
Ammon 10 and 13 Wards Water Well
Falcon Ridge Water Wells
Melaleuca Fire and Water Wells
City of Arco Water Rights Litigation
Bear Lake the Reserve Wells 2a, 2b, 2c 2e
Blackfoot Harbor Well Testing
City of Chubbuck Well Site Study
Work Well Analysis
Idaho Supreme Replacement Well
Lazy Eight Subdivision Water Wells
City of McCammon Well Repair
Nutrient Pathogen Studies-Rigby Area
Southfork Properties Water Well
Teton Springs Water Wells
Volm Bag Fire Well
Garden Creek Hydrogeology Study

City of Ammon Wells 10 and 11
Blackhawk wells 1 and 2
City of McCammon Well
V-1 Propane Water Well
Army Corp of Engineering
Nordic Ranches Well 3
Canyon Estates Well 2
People's Canal versus Lilya
Horseshoe Canyon Wells
City of Inkom Water Well
Legend Hills Water Plan
Osgood School District Well
Riverton, WY Water Well
Swan Valley Cabins
Teton Town Homes
City of Weston Well 3
Rigby Stake 8 Wells

Comora Loma Wells 5, 6 and 7
Corporate Express Fire and Water Wells
Falls Water Well Location Assessment
ANDCO Water Well
Bear Lake West Water Well
Birch Creek Hydrogeological Study
Cedar Springs Groundwater Evaluation
Dalrymple Water Well Study
DNAPL in Fractured Rock Geo-Engineers
Thomas Farm Water Wells
Legacy Village Hydrogeology Study
Palisade Creek Hydrogeology Study
Star Sewer and Water Well 3
Teton Creek Water Wells
V-1 Propane Water Well
Wildhorse Ridge Well Testing
Garfield 3, 4 Wards Water Wells

EXHIBIT P20

P02193

AFFILIATIONS

Registered Professional Geologist (Idaho, No. 643; California, No. 4694, Washington No. 890, Wyoming No. 3472)
National Ground Water Association
Geological Society of America

PUBLICATIONS AND REPORTS

A list of references is attached. Dr. Wood has written and lectured extensively on the subjects of hydrology, geophysics and the Snake River Plain Aquifer. .

EXTERNAL PUBLICATIONS

- Wood, T.R., S.J. Losinski, and E.R. Neher, 2006, "OU 10-08 RI/FS An Overview of the OU 10-08 Ground Water Model", Great Rift Science Symposium Proceedings, Idaho Geological Survey Special Bulletin, *in review*.
- Whitmore, E.J., T. R. Wood, B. Orr, E.R. Neher, S.J. Losinski, 2006, "Status of Drilling for 2005 for the INL WAG 10 Deep-Corehole Project" Great Rift Science Symposium Proceedings, Idaho Geological Survey Special Bulletin, *in review*.
- Rohe, M.J., S.O. Magnuson, H. Huang, M.A. Plummer and T.R. Wood, 2006, "Multi-objective and multi-scale modeling approach for Idaho National Laboratory Operable Unit 10-08 Sitewide Groundwater Model" Great Rift Science Symposium Proceedings, Idaho Geological Survey Special Bulletin, *in review*.
- Wood, T. R., M. J. Nicholl and R. J. Glass "Influence of fracture intersections under unsaturated, low flow conditions", *Water Resources Research*, VOL. 41, W04017, doi:10.1029/2004WR003281, April 2005.
- Glass, R. J., M. J. Nicholl, H. Rajaram, T. R. Wood, "Unsaturated Flow through Fracture Networks: Evolution of Liquid Phase Structure, Dynamics, and the Critical Importance of Fracture Intersections," *Water Resources Research*, Vol. 39, (12) No. 1352 doi:10.1029/2003WR002015.
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- Wood, T. R., R. J. Glass, T. R. McJunkin, R. K. Podgorney, R. A. Laviolette, K. S. Noah, D. L. Stoner, R. C. Starr, and K. Baker, "Unsaturated Flow Through a Small Fracture-Matrix Network: Part 1, Experimental Observations," *Vadose Zone Journal* 2004 3: 90-100.
- Fairley, J. P., R. K. Podgorney, and T. R. Wood, "Unsaturated Flow through a Small Fracture-Matrix Network: Part 2, Uncertainty in Modeling Flow Processes," *Vadose Zone Journal* 2004 3: 101-108.
- LaBrecque, D., G. Heath, M. Kerschbaum and T.R. Wood "Considerations for Small-Scale ERT Monitoring of Fluid Flow in Fractured Rock", *Groundwater*, Volume 42, Number 1, January-February 2004, p. 111-118.
- Fairley, J.P. and T.R. Wood, 2003, "Uncertainty in Modeling Flow Processes in Unsaturated, Fractured Rock", *Proceedings of the 10th International High-Level Radioactive Waste Management Conference*, Las Vegas, Nevada, March 30 – April 2, 2003.
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- Faybishenko, B., C. Doughty, M. Steiger, J.C.S. Long, T.R. Wood, J. Jacobsen, J. Lore and P. Zawislanski, 2000, "Conceptual Model of the Geometry and Physics of Fluid Flow and Chemical Transport in Unsaturated Fractured Basalt: Box Canyon Site, Idaho," *Water Resources Research*, 37(12), 3499-3522, 2000.
- Faybishenko, B., P.A. Witherspoon, C.Doughty, J.T. Geller, T.R. Wood, and R.K. Podgorney, Multi-Scale Investigations of Liquid Flow in a Fractured Basalt Vadose Zone, In "Flow and Transport Through Unsaturated Fractured Rock," D.D. Evans, T.J. Nicholson, and T.C. Rasmussen, Editors, *Geophysical Monograph* 42, Second Edition, pp. 161-182, 2001.
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PRESENTATIONS AND SYMPOSIUM PROCEEDINGS

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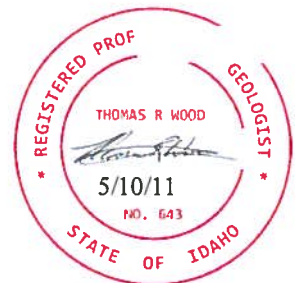
Clearwater Geosciences, LLP
Ground Water Development and Exploration

Groundwater Injury Analysis Regarding Transfer Application of Telford Lands, LLC Moore, Idaho

May 2011

Prepared by

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Clearwater Geosciences, LLP
Ground Water Development and Exploration

May 10, 2011

Coalition
c/o Nathan Carpenter
PO Box 307
Arco, Idaho 83213

RE: INJURY ANALYSIS FOR IDWR WATER HEARING

Dear Mr. Carpenter:

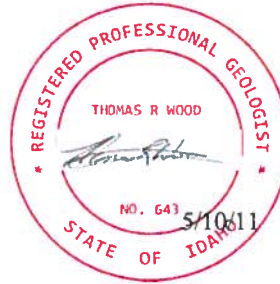
Please find attached my summary report on the pumping test and injury analysis regarding the proposed Telford water right transfer.

Please call me if you have any questions.

Respectfully,

A handwritten signature in blue ink, appearing to read "Thomas R. Wood".

Thomas R. Wood, PhD, PG





Introduction

Telford Lands, LLC, a corporate farm, is proposing to transfer 5 cfs, which is a portion of an agglomeration of water rights (totaling 37.03 cfs), to a new point of diversion (POD) about ½ mile southwest of Moore Idaho. Details of the transfer can be found on file with the Idaho Department of Water Resources (IDWR) as Transfer Number 76286. To support this transfer a new well is proposed to be drilled in the SE ¼ of the NE ¼ of the SE ¼ of Section 29, T5N, R26E. Allegedly, the new well is required to resolve a shared well dispute with Telford and Babcock for use of the Babcock Well. However, during the course of this study it was apparent that Telford is upgrading the Babcock well from a 60 hp motor to a 150 hp motor, which will more than double the output of the well.

Figure 1 is an air photograph that shows the locations of wells in the area. The proposed new POD is shown with a red push pin labeled “Proposed New Well” and the shared well, subject of the alleged dispute, is shown with a yellow push pin labeled “Babcock Well”. The proposed new POD as defined in the transfer application is also shown in Figure 2.

The purpose of this report is to describe the regional and local hydrogeology, present the results of a pumping test of the Nate Carpenter Irrigation Well and present an aquifer injury assessment for the proposed Telford transfer.

Geology

The best summary of the Basin hydrogeology is found in a USGS Report entitled “Water Resources in the Big Lost River Basin, South-Central Idaho” (Crosthwaite, et al., 1970). Much of the general geology presented in this section is taken from this report. Other references used to in this geology section include following or as cited in the text.

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The Big Lost River Valley was produced by Basin and Range faulting, which began about 17 million years ago, long after thrusting and folding of the geologic formations had ceased. Steep faults, dipping more than 60°, bound the surrounding mountains. The valley was formed between the surrounding mountain ranges as a block of the earth’s crust was down-dropped forming a half-graben. The major fault in the Big Lost River Valley is a normal fault that runs along the northeast side of the valley (Skipp, et al., 2009). This active fault is called the Lost River Fault Zone, which last moved in 1983



during the Borah Peak earthquake. It bounds the east side of the Lost River Valley east of Arco, Darlington and Moore.

The mountains are largely composed of Mesoproterozoic Belt Supergroup overlain by Paleozoic strata, mainly carbonates. The rocks were folded and thrust faulted in the Cretaceous Sevier Orogeny. Eocene age Challis volcanic rocks cover portions the older strata in the Lost River Range and valley floor, and are in turn overlain by Oligocene and Miocene tuffs, conglomerates and lake beds.

During the ice ages, glacial and stream deposits filled the valley. Much of the older sediment is comprised of cemented alluvium, which transmits water slowly compared to the younger and shallower valley fill. The floor of the valley is covered with loam and gravelly loam soils. Basalt of the Snake River Group is present in the subsurface near the mouth of the Big Lost River Basin.

The relatively young, unconsolidated alluvial deposits transmit large amounts of water, yielding large amounts of water to wells. These unconsolidated alluvial deposits are the best aquifer material in the Big Lost River Basin. The older rocks of the surrounding mountains and cemented alluvium only transmit small quantities of water to wells making them less suitable for irrigation purposes. The unconsolidated alluvial deposits include river alluvium, glacial deposits, and young alluvial fans. The alluvial deposits vary significantly from one location to the next and include clay, silt, sand, gravel and boulders. Well driller's logs show that the alluvial deposits are highly variable in particle size and in degree of sorting. In general, better sorting (more uniform grain size) creates better aquifer permeability. The fan deposits consist of materials ranging in size from clay to boulders. Thus wells drilled on the alluvial fans normally encounter poorly sorted material. The Big Lost River has in places eroded the toes of the fans and reworked the deposits. This resulted in the formation of good aquifers composed largely of well-sorted and stratified sand and gravel. Most wells drilled on the flood plain of the river are finished in these aquifers.

There are a few well logs available in the area of the proposed transfer that can be used to define the subsurface stratigraphy. The well log for the Babcock well is presented in Figure 3 (called the Rhineflesh well). Cushman Well Drilling Co. drilled the well in 1955 to a depth of 180 ft. At the time of drilling the depth to water was 51 feet. Thus, the well penetrated 129 ft of saturated sediment (i.e. from the water table to 180 ft). The driller described the geology as consisting of layers clay, sand and gravel. Two layers of clay were noted having a total thickness of 20 ft. The driller perforated (put holes in) 86 ft of casing or about 67% of the saturated water column. This suggests that the driller considered about 67% of the saturated sediments to be "water-bearing" and worthy of perforating.

The Nate Carpenter Irrigation Well does not have a well log, but it is known to be 167 feet deep and the depth to water on April 9, 2011 was 54 ft.



Hydrogeology

As described above, the Big Lost River Valley is a sediment filled graben between two mountain ranges. Clean layers of sand and gravel produce large quantities of water to wells. The surrounding Mountain Ranges have much lower permeability than the valley sediment. Until 1964, the water table in most of the Big Lost regional aquifer was only a short distance, less than 10 ft, below the surface (Mundorff et al., 1964). The Big Lost River flows through the valley and enters the Eastern Snake River Plain where it flows to its terminus, or is lost via seepage to the Eastern Snake River Plain aquifer. The ground water in the aquifer flows through the valley and discharges to Eastern Snake River Plain aquifer directly (Said, et al., 2003).

Crosthwaite et al., 1970, described the strong relationship between river flow in the Big Lost River and water levels in the aquifer (Figure 27, page 77) and found that groundwater moves rapidly through the sediments, flowing down valley to be discharged to the Snake River Plain Aquifer beneath the mouth of the basin. Seasonal and climatic cycles have a pronounced effect on flow in the river and water levels in the aquifer. Figure 26, page 76, in Crosthwaite et al. 1970, shows tens of feet fluctuation in well water levels over periods as short as 3 years. The well nearest the proposed POD presented in the Crosthwaite Report, 5N-26E-20aabl (one mile north), shows 23 ft of fluctuation during the period from 1966 through 1968. On page 75, Crosthwaite, et al. states that *in a series of dry years, the water table would be 10 to 60 feet lower in the parts of the valley where the river loses water.....*

The critical relationship between flow in the Big Lost River and ground water levels near the proposed transfer is demonstrated by comparing the flow at a station on the Big Lost River near Arco to ground water measurements in a well in the Well Orchard. The data used for this comparison can be found on the USGS websites (USGS, 2011 a & b). The Well Orchard Well, 05n26e-32dba1, is located about a mile southwest of the proposed POD. The data are plotted in Figure 4 and show a strong correlation between flow in the Big Lost River and water level rise in the Well Orchard Well and vice versa. Once the flow in the Big Lost River ceases, a decline in ground water levels occurs thereafter.

Wide fluctuations of ground water levels are the norm in the Big Lost River Valley and in general, water levels in wells have been declining over the past several decades. Many of the domestic water wells have been deepened because the wells have gone dry. Figures 5 and 6 are well logs for the Nate Carpenter domestic well and Harold Babcock well, respectively (the locations are shown in Figure 8). In 2002, due to declining water levels, the Nate Carpenter Domestic Well had to be replaced because the existing well went dry and it could not be deepened. In 1998 the Harold Babcock Domestic Well had to be deepened because it went dry.

Not only are water levels dropping such that the domestic wells must be deepened but declines in the deeper irrigation wells are also widespread. In 2002, water levels decreased in the area such that Nate Carpenter had to lower the depth setting of his pump in the spring of 2003. The receipts for this work are provided in Attachment 1.



Aquifer Properties, Confinement and Boundary Conditions

Crosthwaite, et al., 1970, considered the aquifer to be mostly under unconfined conditions. The authors state that *“ground water occurs mostly under water-table conditions (unconfined) in the main valley but locally artesian conditions exist (confined). Because of the variability of the alluvial deposits, weak artesian pressures may be present in other parts of the basin, but they have not yet been observed.”*

A more recent study in close proximity to the proposed Telford POD, indicates that the aquifer to the west of Moore is confined. The 1993 study of the Well Orchard (Bassick and Jones, 1993), which is about a mile south of the proposed POD, determined that the aquifer is confined in this area. In the Bassick and Jones 1993 study, an aquifer pumping test was conducted. The authors found *“using the Theis (confined) type-curve analysis indicated that aquifer transmissivity ranged from 61,000 to 330,000 ft²/day values of 130,000 to 200,000 ft²/day were most probable. Storage coefficients range from 0.0001 to 0.02; the value of about 0.001 was most probable. Where appropriate, the Jacob solution (also a confined solution) was employed and changes in the drawdown per unit time (slope of the curve) indicate that the cone of depression intercepted a barrier boundary. The barrier boundary is believed to be where permeable unconsolidated valley fill abuts relatively impermeable consolidated sedimentary or crystalline rock (i.e. the mountains).*

Conceptual Aquifer Model

On the basis of the available data the aquifer near the proposed POD is probably confined but may have portions that are locally unconfined. The well depths and other data indicate that aquifer is at least 130 ft thick. The aquifer is long and narrow being constrained by the older, much less permeable rocks that form the surrounding mountains. The flow is to the south and discharges to the Snake River Plain Aquifer. Said et al., 2003, estimates that approximately 370 cfs of ground water flows from Big Lost River Valley. This conceptual model is consistent with other studies (Szczepanowski, 1982, Johnson et. al., 1991, Mudorff et al., 1964, Said et al., 1993, and Whitehead, 1992). Figure 7 shows the geographic setting of the Big Lost River Valley aquifer in the area near the proposed POD.

Another factor in the Conceptual Model of the Big Lost River Valley aquifer is the dramatic variations in saturated aquifer thickness between wet and dry climatic cycles. This factor is critically important for evaluating the impact from the proposed transfer as ground water levels may vary as much as 100 ft over the period of a few years. Most aquifers do not experience such dramatic water level changes over such short periods of times. Water level fluctuations of this magnitude impact the ability of the aquifer to store and transmit water.

Aquifer Pumping Test

In order to collect data required for calculating the impact of the proposed Telford transfer, a pumping test was conducted using the Nate Carpenter Irrigation Well. Two



observation wells were used for the test, the Loftus well and the Babcock well. The layout of the well field is shown in Figure 8. The Nate Carpenter Irrigation Well is approximately 4000 ft northwest of the proposed POD as shown in Figure 8.

In-situ brand pressure transducers were installed in the Carpenter, Loftus and Babcock Wells. These pressure transducers automatically collected water pressure and temperature readings at a programmed sampling rate (every 6 seconds for the pumped well and every 12 seconds for the observation wells). Flow was measured using a Thermo-Polysonics DCT7088 Portable Digital Correlation Transit Time Flowmeter, which is an external, ultra sonic type flow meter. The pumping rate during the test was 1500 gpm.

The pump was started April 12 at 17:48 hours. Drawdown in the Nate Carpenter Irrigation Well was initially about 8 ft and declined throughout the duration of the test to a maximum of about 8.5 ft. Drawdown observed in both observation wells rendered uninterruptible due to fluctuations in barometric pressure and rising aquifer levels due to the apparent influx of river water. Unstable weather conditions (i.e. a storm) during the three day test cause significant barometric effects to water levels. The water levels in the aquifer were rising as the river began flow a few weeks before the test started making interpretation of the data problematic. A larger flow rate would have been necessary to utilize the pumping test data from the observation wells. Attachment 2 contains the various plots and analyses for the pumping test.

Several different type curves for different aquifer conditions were tried in order to determine the best match to the data, these solutions included confined, unconfined and leaky confined. The best match to the data was found using the Cooper-Jacob form of the Theis solution for a confined aquifer (see Attachment 2). This is the same type curve solution used by Bassick and Jones (1993) for the pumping test of the Well Orchard. As seen in Figures A2-1 and A2-2, the slope of the drawdown curve changes from a flatter slope to a steeper slope at an elapsed time of about 1000 minutes. The change in the slope of the curve indicates that the cone of depression intercepted a barrier boundary. The barrier boundary is believed to be where permeable unconsolidated valley fill abuts relatively impermeable consolidated rocks forming the mountains to the west of the Nate Carpenter Irrigation Well. The best match to the early time data is for a transmissivity of about $6.8 \times 10^5 \text{ ft}^2/\text{day}$ and the best match to the late time data is $8.4 \times 10^4 \text{ ft}^2/\text{day}$. Aquifer storativity cannot be accurately determined from a single well pumping test. The Well Orchard Pumping Test, which had viable observation wells, showed the most common storativity value was 0.001.

Impacts from Proposed Transfer

Calculations

From the pumping tests of the Nate Carpenter Irrigation Well and the Well Orchard it is known that a barrier boundary exists in the area. The presence of a barrier boundary is consistent with the conceptual model of the aquifer being a long narrow strip of sediment between two mountain ranges as shown in Figure 3. The nearest barrier boundary is at



the foot of the mountains (as seen in Figure 7), which is about 1500 ft west of the Nate Carpenter Irrigation Well and about 500 ft west of the Babcock well. The other barrier boundary is the foot of the Lost River Range about 3 miles to the east. Because of the steep hydraulic gradient of the water table and the pumping to the south at the Well Orchard and other wells the southern boundary of the aquifer will also behave like a barrier boundary (i.e. no flow from the south).

An impermeable boundary to an aquifer has the effect of deforming the shape of the cone of depression and increasing the depth to water, especially towards the barrier boundary. Figure 9 shows diagrammatically the concept of a barrier boundary on the cone of depression. As described earlier, the Big Lost River Valley Aquifer has at least two well defined barrier boundaries consisting of the Big Lost and Pioneer Mountain Ranges and a third boundary to the south that will act as though it is a barrier. No aquifer is of infinite areal extent as assumed by solutions to most pumping tests so the impact of aquifer boundaries is well studied and the effects of boundaries on pumping cones of depression are understood. The most common method of handling the effects of an aquifer boundary is image well theory. Walton (1962) states that image-well theory as applied to ground-water hydrology is as follows: *the effect of a barrier boundary on the drawdown in a well, as a result of pumping from another well, is the same as though the aquifer were infinite and a like discharging well were located across the real boundary on a perpendicular thereto and at the same distance from the boundary as the real pumping well. Thus the effects of a barrier boundary on drawdown in a well can be simulated by use of hypothetical image wells.* Figure 10 shows image-well theory applied to a barrier boundary.

Image well theory becomes more complicated as more boundaries impact the pumping cone of depression. The image-well system for a pumping well in an aquifer restricted with boundaries like the Big Lost River Valley Aquifer is shown in Figure 11. The positions of the image wells are determined by adding imaginary discharging wells so that, in combination with the real discharging well, the condition of no ground-water flow across any of the three boundaries is established (Ferris et al., 1962). As shown in the figure, two parallel lines of discharging image wells are required, separated by twice the distance between the real well and the southern barrier. Theoretically the two lines of image wells extend to infinity in both directions from the real well. The practical analysis of this problem requires the addition of only enough image wells so the effect of adding an additional image well is negligible (Ferris et al., 1962). It is seen from Figure 11 that there is a repeating pattern in the positions of the image wells, so that the locations of only the first few images are required to determine the locations of as many succeeding image wells as are needed.

A commercially available ground water software program, which utilizes image well theory, was used to calculate aquifer drawdown from pumping of the proposed Telford POD. The forward solution function of the AQTESOLV Computer Program was used to calculate the drawdown from the proposed Telford transfer. Model boundaries were established for AQTESOLV calculations as shown in Figures 12 and 13. The coordinates for the corners of the boundaries and the well locations are presented in Table A3 -1. The



locations are referenced to a local coordinate system where the Nate Carpenter Irrigation Well is at point (0,0). The east and west boundaries of the model are no flow boundaries, coincident with the foot of the mountain ranges. The southern boundary is also considered a no flow boundary because of the steep hydraulic gradient, perched water lens and the numerous pumping wells to the south, which prevent water from flowing upgradient from a southerly direction. Keep in mind that by definition the barrier boundary is imaginary and the image wells are manipulated so that the condition of no flow is created (Ferris et al., 1962), this is exactly the condition of the southern boundary. There is no boundary to the north, thus water can flow to the pumped well(s) from that direction.

Table A3-2 summarizes the parameters employed in the AQTESOLV calculations. The transmissivity used is the late time curve matched value from the Nate Carpenter Irrigation Well pumping test. This value is appropriate because of the long duration of pumping and the fact that the late time change in slope of the drawdown curve occurred after about 1000 minutes. Under actual drought conditions it is likely that the aquifer transmissivity would decrease over time due to the thinning of the aquifer (i.e. the aquifer transmissivity is equal to the aquifer thickness times the hydraulic conductivity). Decreasing transmissivity would cause the drawdown to be greater than indicated by the AQTESOLV analyses. The storativity used is the value measured in the pumping test of the Well Orchard or 0.001. This is the best local storativity value.

The aquifer thickness is estimated to be 150 ft. This thickness is equal to the saturated water column for the deepest well in the area. As mentioned previously, the Babcock well has a saturated water column of 129 ft. The Nate Carpenter Irrigation Well penetrates about 113 ft of aquifer. It is not known exactly how many feet of saturated water column exist in the Loftus and Waddoups Wells, but Waddoups thinks his well is 190 ft deep based on some paperwork he found (Waddoups oral communication 2011). If the depth to water is 40 ft in Waddoups well then the saturated water column is 150 ft thick. This thickness probably over estimates the full thickness of the aquifer due to the presence of clay layers within the upper 150 ft. Also, during drought conditions the saturated water columns for these wells will be less. A thinner aquifer would transmit and store less water and therefore have more drawdown.

The ratio of the vertical hydraulic conductivity to the horizontal conductivity (K_z/K_r) is a measure of the ability of water to move vertically in an aquifer. Because of layering of sand and clay it is almost always less than 1. Without additional information it is not possible to know K_z/K_r , so a text book value was taken for alluvial sediments of 0.1 (Freeze and Cherry, 1979). This assumed value is the industry standard “best guess” and will make very little difference in the outcome of the predictions because of the long duration of the pumping.

The transfer application is for 5 cfs for the period from April 1 to November 1, which is 214 days or 308,160 minutes. A second pumping scenario was also considered in addition to just pumping 5 cfs from the proposed POD. Despite mentioning in the transfer application the alleged dispute with Babcock and suggesting that the Babcock



Well may not be pumped, it is clear that Telford Lands plans to pump the Babcock well. Evidence of this is that Telford is installing a much larger motor on the Babcock Well, which will increase the capacity of this well from about 1500 gpm to greater than 3000 gpm (see documentation in Attachment 4). So, in addition to only the proposed transfer, an additional calculation is provided that also includes the Telford increase to the Babcock well. This second calculation is needed because the neighbors have not experienced the drawdown impacts from the additional 1500 gpm to be pumped from the Babcock Well.

Figures A3-1 and A3-2 are forward solution plots for the two pumping scenarios, pumping at the proposed POD and pumping both the proposed POD and the Telford expansion of the Babcock Well. The colored lines indicate drawdown for the various wells as indicated in the key. Drawdown is seen to increase slowly at first and then increase sharply after 30,000 to 40,000 minutes (3 to 4 weeks). Ultimately, the maximum drawdown for the proposed POD only case is 45 ft and is 62 ft for pumping both the proposed POD and the Telford expansion of the Babcock Well. Table A3-3 summarizes drawdown in feet for the two scenarios for the nearby wells and the proposed POD well. The drawdown for the neighboring wells ranges from 40 feet to 60 feet.

Impact Discussion

A limitation to the AQTESOLV calculations is that it under predicts the actual impact of the proposed POD. This is because the effects of thinning of the aquifer under drought conditions and pumping by others are not considered. Impacts from pumping multiple wells are additive and drawdown in a single well from multiple pumping wells (including itself) can be summed in linear manner. A typical injury analysis only considers the incremental increase in pumping caused by the proposed action. However, most aquifers do not have the dynamic water level conditions known to exist in the Big Lost River Valley. The additive relationship of pumping is only true if the aquifer properties remain constant over time, i.e. the values of transmissivity and storativity are fixed. Aquifer transmissivity is directly related to aquifer thickness and it will decrease as the aquifer thins (i.e. $T = b \cdot K$). Another factor not considered is that under drought conditions all ground water pumpers will use their wells, which will greatly accelerate the thinning of the aquifer. The combination of increased pumping in a thinning aquifer will create a feedback mechanism causing dramatic if not catastrophic water level declines during droughts. The proposed Telford transfer will add to this thinning effect causing even more drawdown than predicted here. As will be shown below, even with conservative calculations (under estimate) of impact presented above, the drawdown from the proposed transfer will be significant and unacceptable.

The approval of the proposed transfer must ensure protection of the nearby users during drought conditions when water levels will be at their lowest and maximum pumping will prevail. This is when ground water will be needed the most. The pumping test conducted this spring was under conditions of near maximum water levels and minimal ongoing groundwater pumping (i.e. a late wet spring). These conditions greatly favor the applicant because aquifer parameters measured by the test are near maximum levels. In



order to estimate the full impact of the proposed transfer under drought conditions historical aquifer levels are considered.

To understand the range of fluctuations anticipated in water levels in the area the well hydrograph from the Well Orchard Well is evaluated. Figure 14 is the hydrograph for this well and shows the approximate location. As can be seen, the range in water levels is about 75 ft between wet and dry climatic cycles. During several measurement periods the pump in the well (05n26e-32dba1) was on and the measured depth to water was greater than it would be under static conditions, these values were removed from the hydrograph to enhance clarity. The range of 75 ft does not include periods when the pump was on. The lowest water levels occurred between 2002 and 2005 and this is consistent with the period when Nate Carpenter had to lower his pump as described earlier.

To consider the impact of the proposed transfer on other groundwater users during periods of low water, a detailed assessment of the Nate Carpenter Irrigation Well is performed. The total drawdown in the Nate Carpenter Irrigation Well during periods of drought is given by the following relationship.

Drawdown = drought decline + POD drawdown cone + in well pumping decline

Where:

Drought decline is the range of water levels	= 75 ft
POD drawdown cone from AQTESOLV calculations	= 40 ft
In well pumping decline (i.e. drawdown needed to pump water)	= 8.5 ft

Thus, the water level decline in the Nate Carpenter Irrigation Well during drought periods will be 123.5 ft if the proposed transfer is approved. The decline in Nate Carpenter's well is likely to be more as well inefficiency will increase during droughts, requiring more head loss to pull water into the well. Since there is only 113 feet of saturated water column in the Nate Carpenter Irrigation Well, the well can be expected to go dry during periods of drought if the proposed water transfer is approved. From Figure 14 the drought periods may be 3 to 4 years long. It is likely that the Babcock well will also go dry during times of drought. The Waddoups Well with about 150 ft of standing water is likely to be seriously impacted but it may have some water during drought periods if the pump is set deep enough.

Drawdown in the domestic wells in the area will be comparable to the drawdown calculated for the Nate Carpenter Irrigation Well for the proposed new POD or about 40 ft. However, because the domestic wells are shallower and have less saturated thickness the impacts will be more severe. The Carpenter Domestic and the Babcock Domestic Wells are 140 and 111 ft, respectively. At the time of drilling, the depth to water in the Carpenter Domestic Well was 78 ft and the Depth to water in the Babcock Domestic Well was 93 ft, indicating a saturated water column of 52 ft and 18 ft, respectively. The wells were drilled/deepened during a drought period so the depth to water measurement is probably near a maximum. Considering only the drawdown cone created by the



proposed new POD during the next drought, these two domestic wells will go dry or nearly dry even without considering the long term declining trend in water levels. Specifically, the Babcock Domestic Well only has 18 ft of saturation to lose before it goes dry, so a 40 ft decline will cause it to go dry. The Carpenter Domestic Well has 52 feet of saturation minus 40 ft leaves 12 feet of for pump submergence and in well drawdown. We do not know the in well drawdown for the Carpenter Domestic Well with only 12 feet of saturated aquifer but it probably will be on the order of several feet. Adding a long term declining trend to regional ground water levels suggests that it likely the Carpenter Domestic Well will go dry during the next drought if the proposed Telford Transfer Application is approved.

Summary

This report summarizes the regional and local hydrogeologic setting, presents results from a pumping test conducted to characterize aquifer transmissivity, makes predictive calculations of drawdown caused by the proposed transfer and using a nearby well hydrograph estimates impacts to nearby wells. The Big Lost River Valley aquifer is a long narrow channel of sediment between mountain ranges that discharges ground water to the Snake River Plain aquifer. 75 ft cycles in well water levels are documented to occur in the area due to climatic cycles. A pumping test was conducted on the Nate Carpenter Irrigation Well that produced an aquifer transmissivity value that is consistent with a pumping test conducted in the Well Orchard. Pumping test data indicate the existence of a nearby barrier boundary in the aquifer. Image well theory was used to account for the impact on the drawdown cone by the aquifer boundaries. The drawdown caused by the proposed Telford Transfer will be about 40 ft to nearby groundwater pumpers. When the correction for drought conditions and in well drawdown are considered two or more nearby wells will go dry and another nearby well will probably be seriously impacted by the drawdown from the proposed Telford POD. Additionally, the data indicates that two domestic wells will go dry during the next drought if the proposed transfer is approved. The drought conditions under which the wells will be dry may last up to 3 or 4 years.

References

- Bassick, M.D. and M.J. Jones, 1992, Aquifer-Test Results, Direction of Ground-Water Flow, and 1984-90 Annual Ground-Water Pumpage for Irrigation, Lower Big Lost River Valley, Idaho, Water Resources Investigation Report 92-4006.
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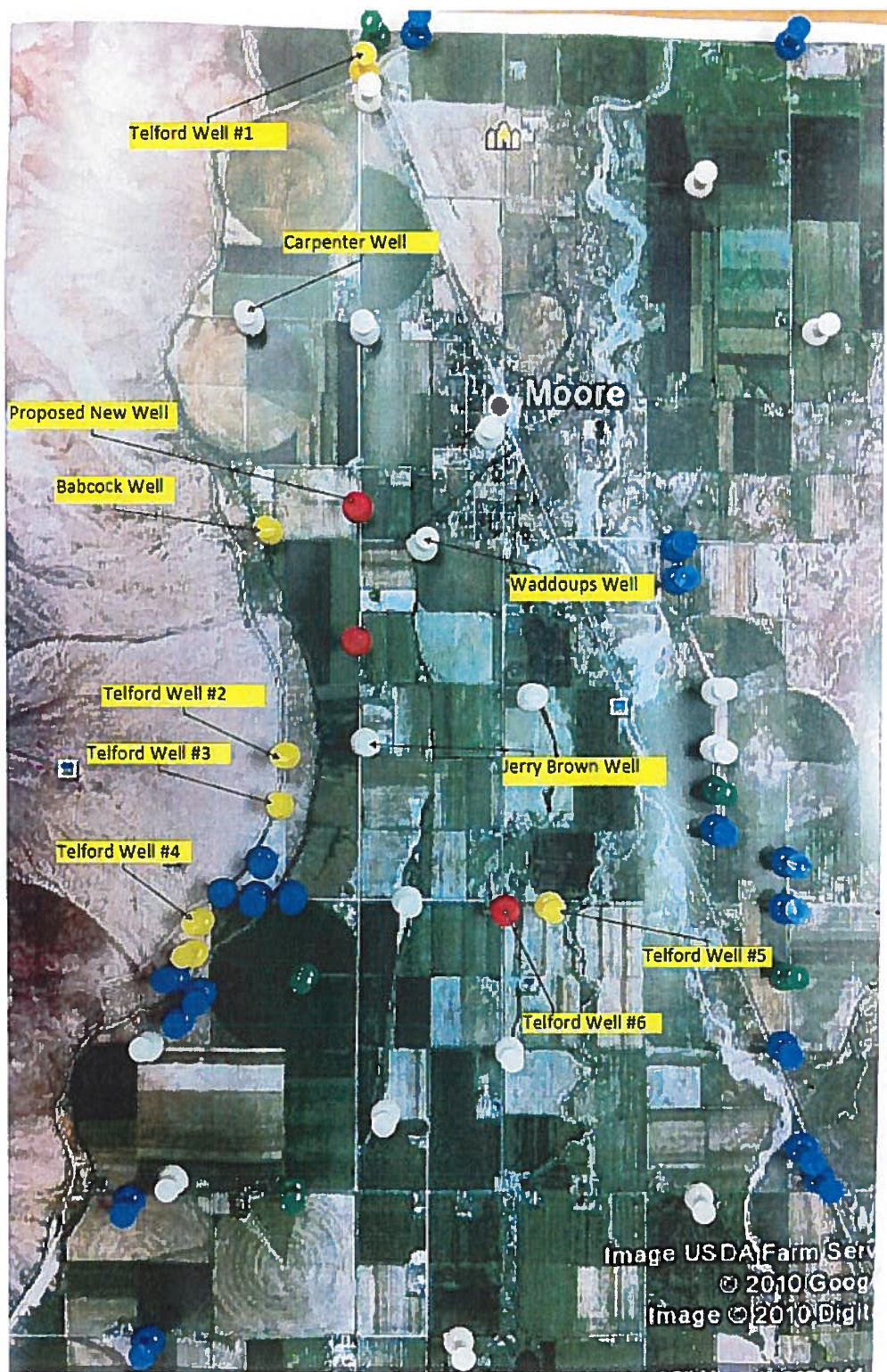


Figure 1 Air photograph of area showing locations of wells of interest in the study.



Figure 2 Location of proposed new point of diversion from Telford transfer application.



Clearwater Geosciences, LLP
Ground Water Development and Exploration

**WELL LOG AND REPORT TO THE
STATE RECLAMATION ENGINEER OF IDAHO**

RECEIVED
FEB 3 1999

Log No. 035578
Rec. _____, 19____
Well No. _____
Permit No. L-25669

(DO NOT FILL IN)

17040218
Owner Karl Rhinoflesh Driller Cushman and Johnson
Address Moore, Idaho Address Blackfoot, Idaho Lic. No. 16
Location of Well 1/4 Sec. 32, T. 5N, R. 30E, E/W County.
and _____ feet N/S, and _____ feet E/W from _____ corner of _____ 1/4 Sec.
Water will be used for Irrigation Total depth of well 100 feet
Size of drilled hole 18 inch Weight of casing per linear foot 60
Thickness of casing 5/16 inch Casing material Steel e.g., pipe, concrete, wood.
Diameter, length and location of casing 100 ft. casing from top to bottom of hole.
(Casing 12" in diameter and under give inside diameter; casing over 12" in diameter give outside diameter.)
Number and size of perforations 1,308 holes located 61 to 67, 120 feet to 61 to 67, 120 feet
87 to 99, 192 to 114 to 175, 678 holes.
from surface of ground. 1,308 perforations in all.
Other perforations: _____
If flowing well, give flow in c.f.s. _____ or g.p.m. _____ and shut in pressure _____
If non-flowing well, give depth of standing water from surface 51 ft. 8 in.
If flowing well, describe control works not flowing. (Type and size of valve, etc.)
On pumping test delivery was _____ g.p.m. or _____ c.f.s. Drawdown was _____ feet
Length of time pumped during check was _____ hr. _____ min. Water temp. 50 ° Fahrenheit.
Date of commencement of well _____ Date of completion of well _____
Type of well rig Duoyrus Eric 201

CASING RECORD

Diam. Casing	From Foot	To Foot	Length	Remarks — Seals, Grouting, Etc.
18-in.	0	100	100	

GENERAL INFORMATION — Pumping Test, Quality of Water, Etc.

NWSE 5.29 SN 26E

3031

Figure 3 Babcock Driller's Well Log.



**Flow in Big Lost River Near Arco (1960 to 2011)
Compared to Depth to Water in Well 05n26e-32dba1 (1985 to 2010)**

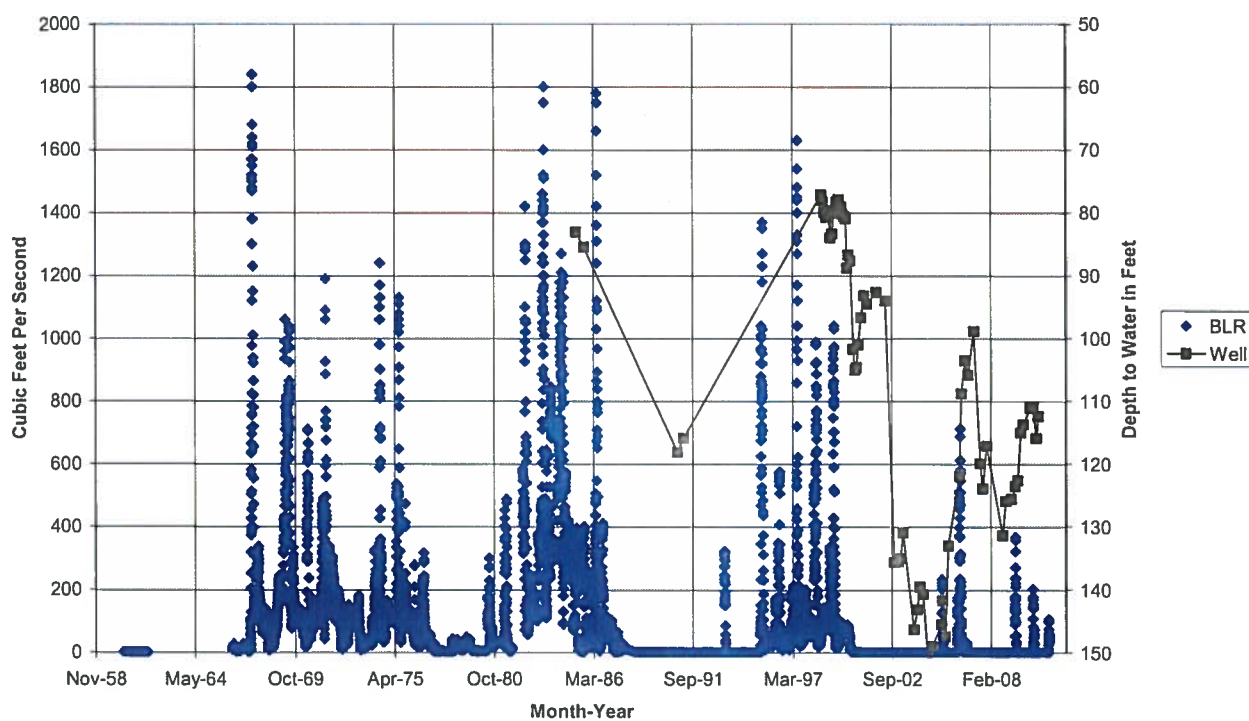


Figure 4 Correlation to flow in Big Lost River to rise in groundwater levels near transfer and vice versa.

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Twp _____ Rge _____ Sec _____
_____ 1/4 _____ 1/4 _____ 1/4
Lat: : : Long: : :

11. WELL TESTS:

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Pumping Level	Time
50		150	11:20

Water Temp. cold Bottom hole temp. _____
Water Quality test or comments: cold

Sketch map location must agree with written location.

Depth first Water Encounter

12. LITHOLOGIC LOG: (Describe repairs or abandonment) water

Sore Dia	From	To	Remarks: Lithology, Water Quality & Temperature	Y
7	0	6	Plum clay	
	6	42	Clay + gravel	
6	42	61	Gravel + sand	
	61	78	Plum clay	
	78	140	Gravel	

Lt. _____ Bk. _____ Sub. _____ Name _____

4. USE: ☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks of Pounds	
Plasticine	1	10	350	Plasticine

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 140
Was drive shoe seal tested? ☐ Y ☒ N How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
60	48	150	20	5700	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS

Perforations Method 726-2007
Screens Screen Type

From	To	Slot Size	Number	Diameter	Material	Casing	Line
122	128	1/4"	24	6	5001	☒	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

Depth flow encountered _____ ft. Describe access port or control devices: *200 ft. of steel*

Completed Depth 140 (Measurable)
Date: Started 2/1/02 Completed 2/5/02

13. DRILLER'S CERTIFICATION

/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name CHANDLER 12/1/79 Firm No. 22

Firm Official _____ Date _____
and
Driller or Operator _____ Date _____
(Sign once if Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES

Figure 5 Nate Carpenter's house well log that had to be deepened/replaced in 2002 due to declining water levels.



Form 238-7
8/90

RECEIVED

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well. JAN 03 1997

APR 02 1992

Page 20
P02219

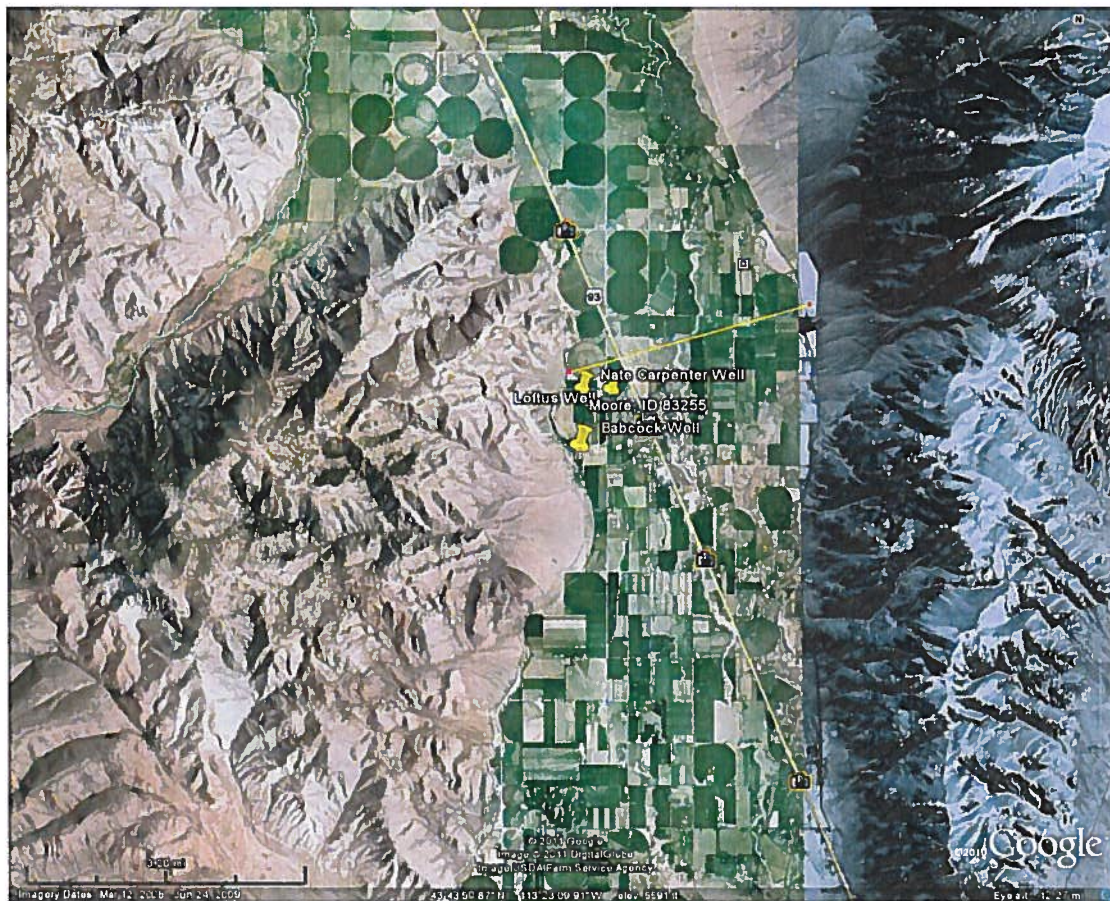


Figure 7 Google Earth satellite image of the Big Lost River Valley showing the aquifer setting between the surrounding mountains. In general the green irrigated land shows the approximate area of the aquifer. The yellow line is about 3 miles long. The proposed POD is located east of the Babcock well.

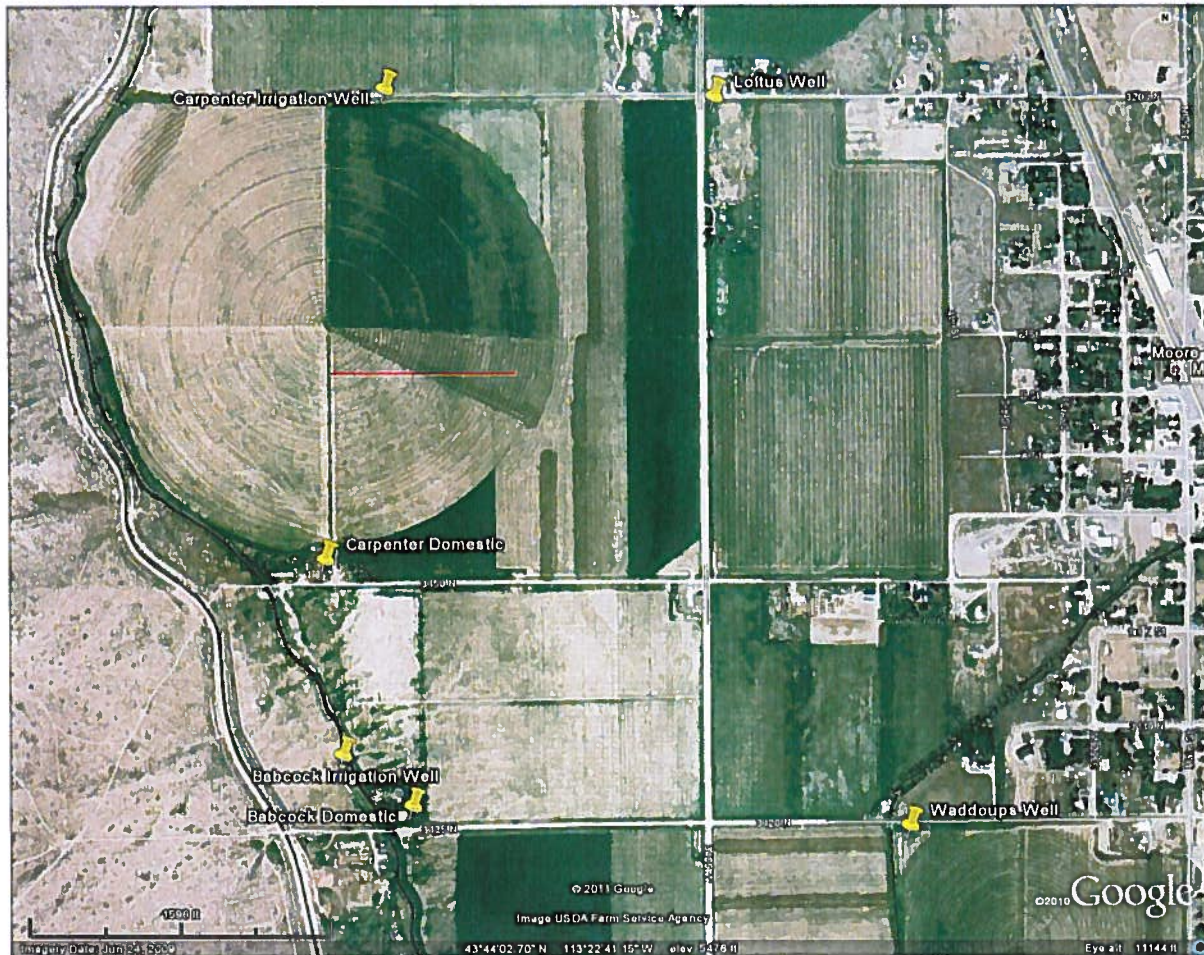


Figure 8 Location map for wells in the area. The red line is 1000 ft long. The Nate Carpenter Irrigation Well was the pumped well and the Loftus and Babcock Wells were the observation wells.

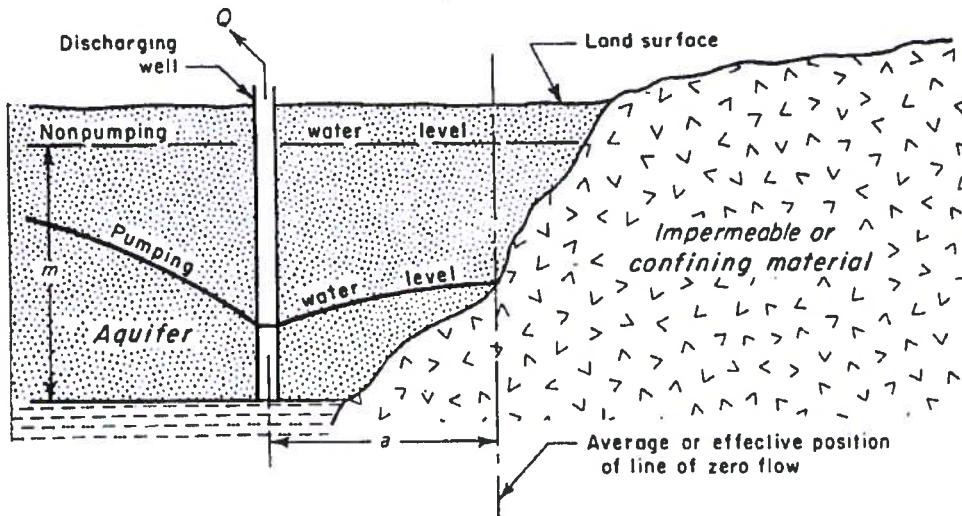


Figure 9 Effects of a barrier boundary on a cone of depression from a pumping test (from Ferris, et al., 1962).

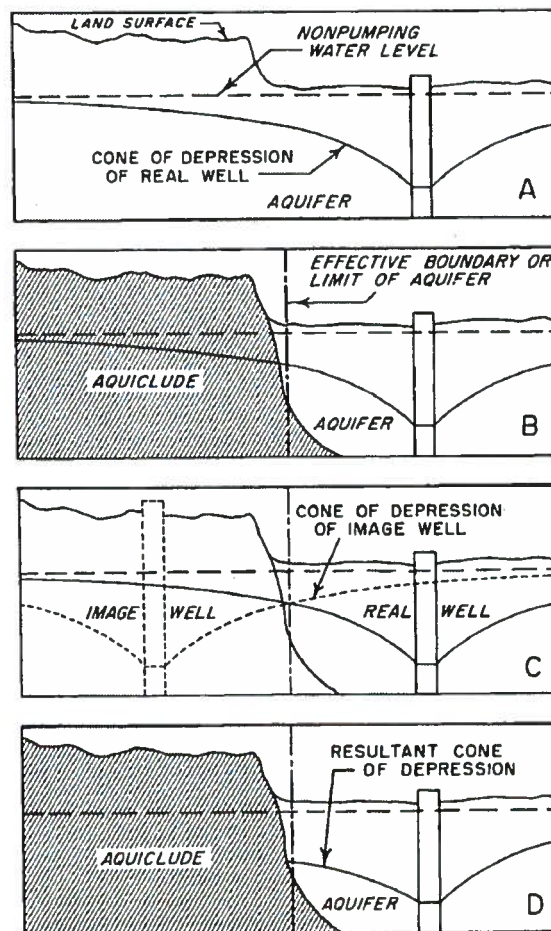
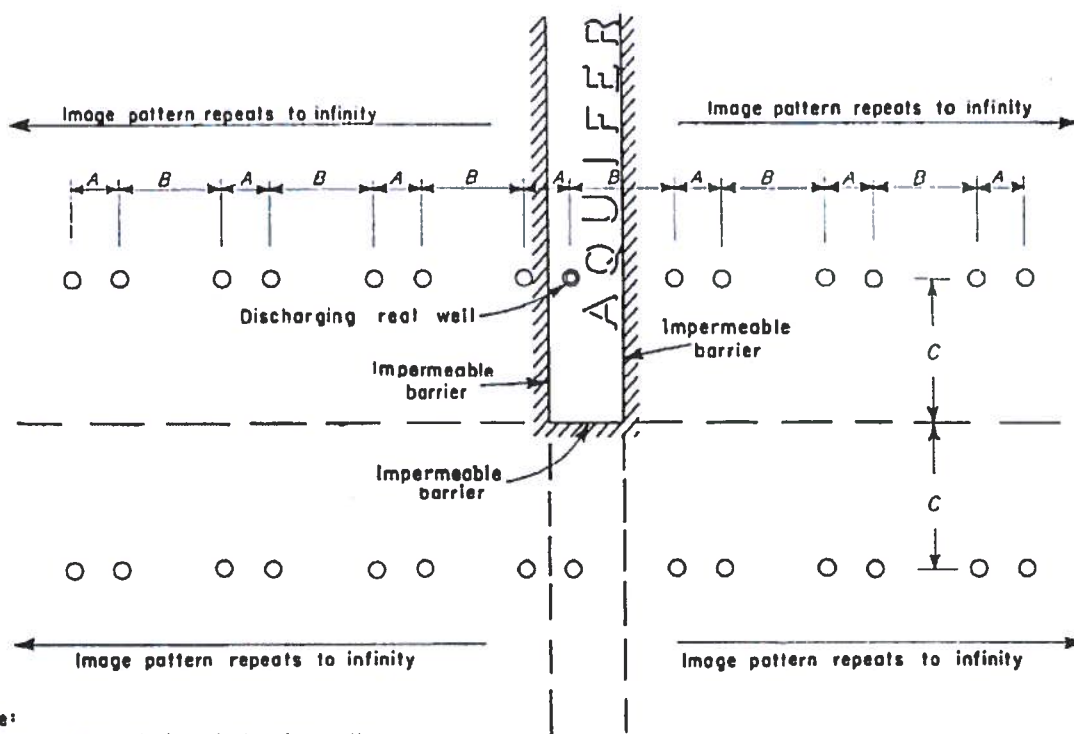


Figure 10 Diagrammatic representation of the image-well theory as applied to a barrier boundary (from Walton, 1962).



Note:
Open circles signify discharging wells

Figure 11 Plan view of image-well system for a discharging well in an aquifer bounded by two parallel impermeable barriers intersected at right angles by a third impermeable barrier. (from Ferris, et al., 1962)

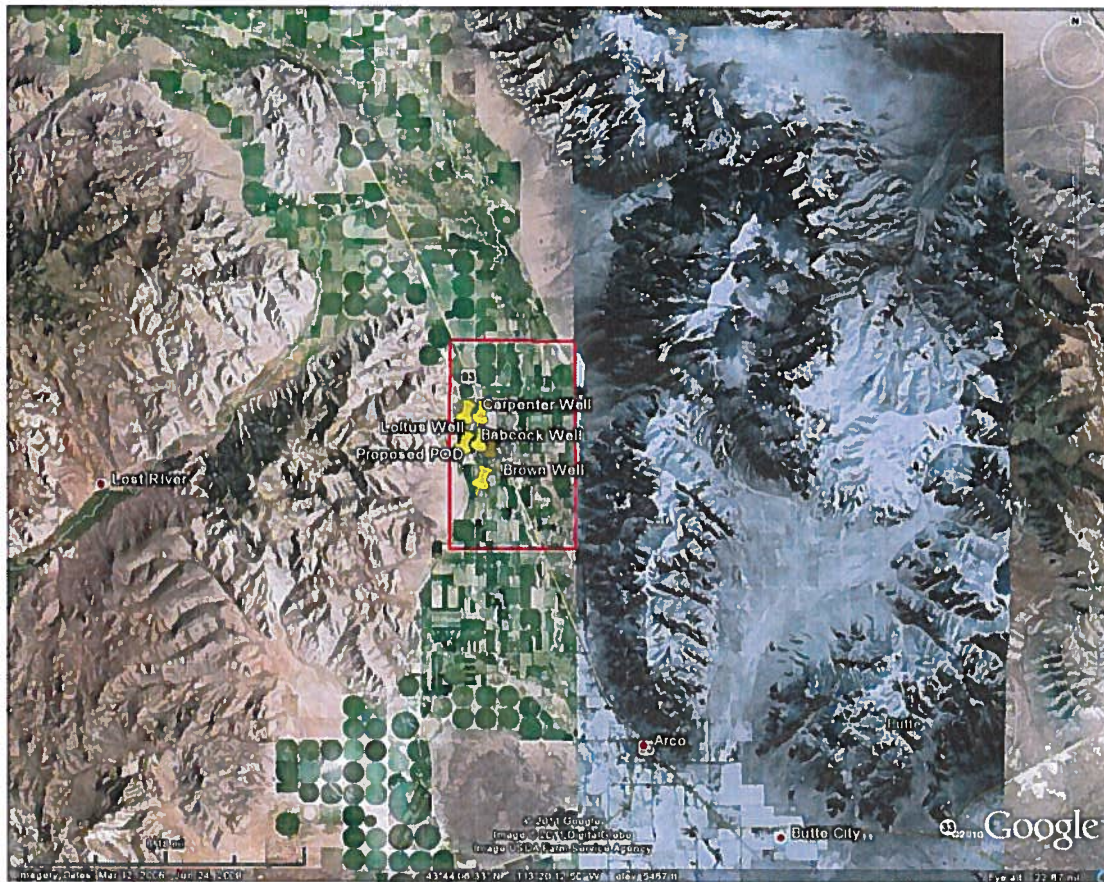


Figure 12 Approximate location of boundaries used in AQTESOLV calculations on a large scale Google Image.

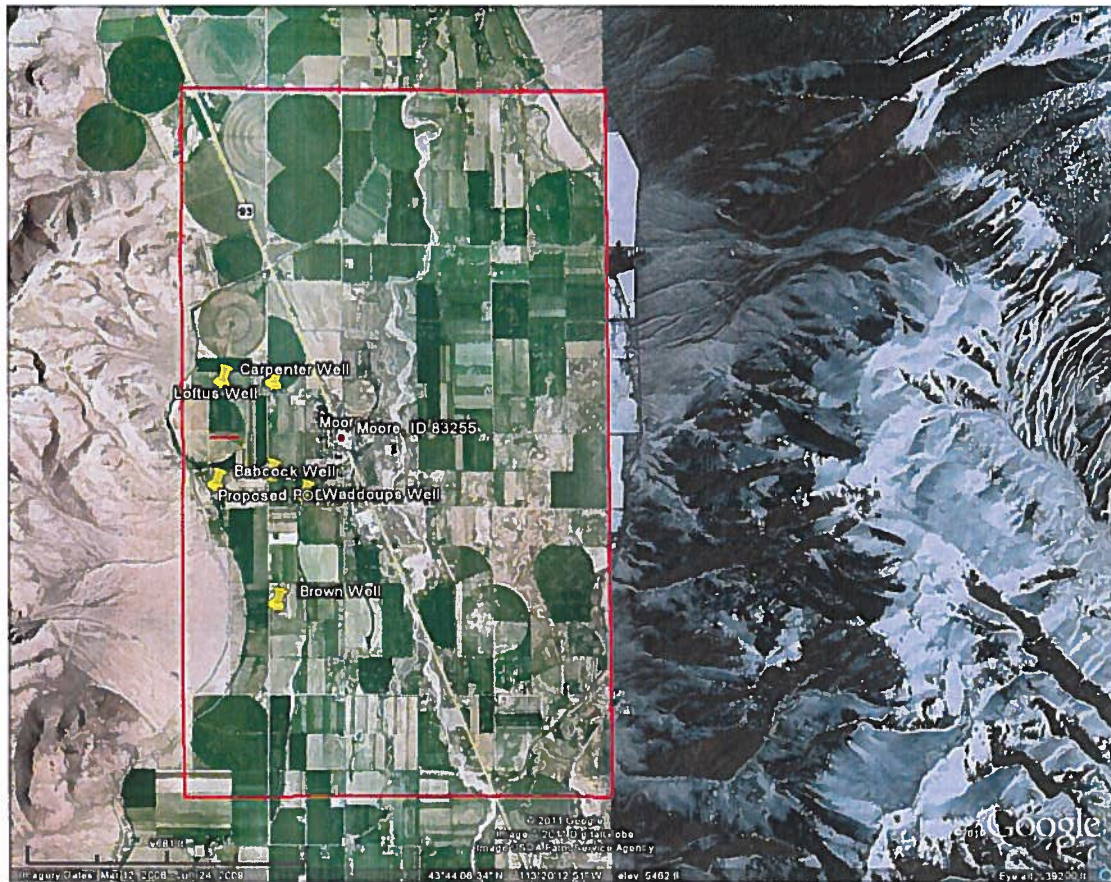
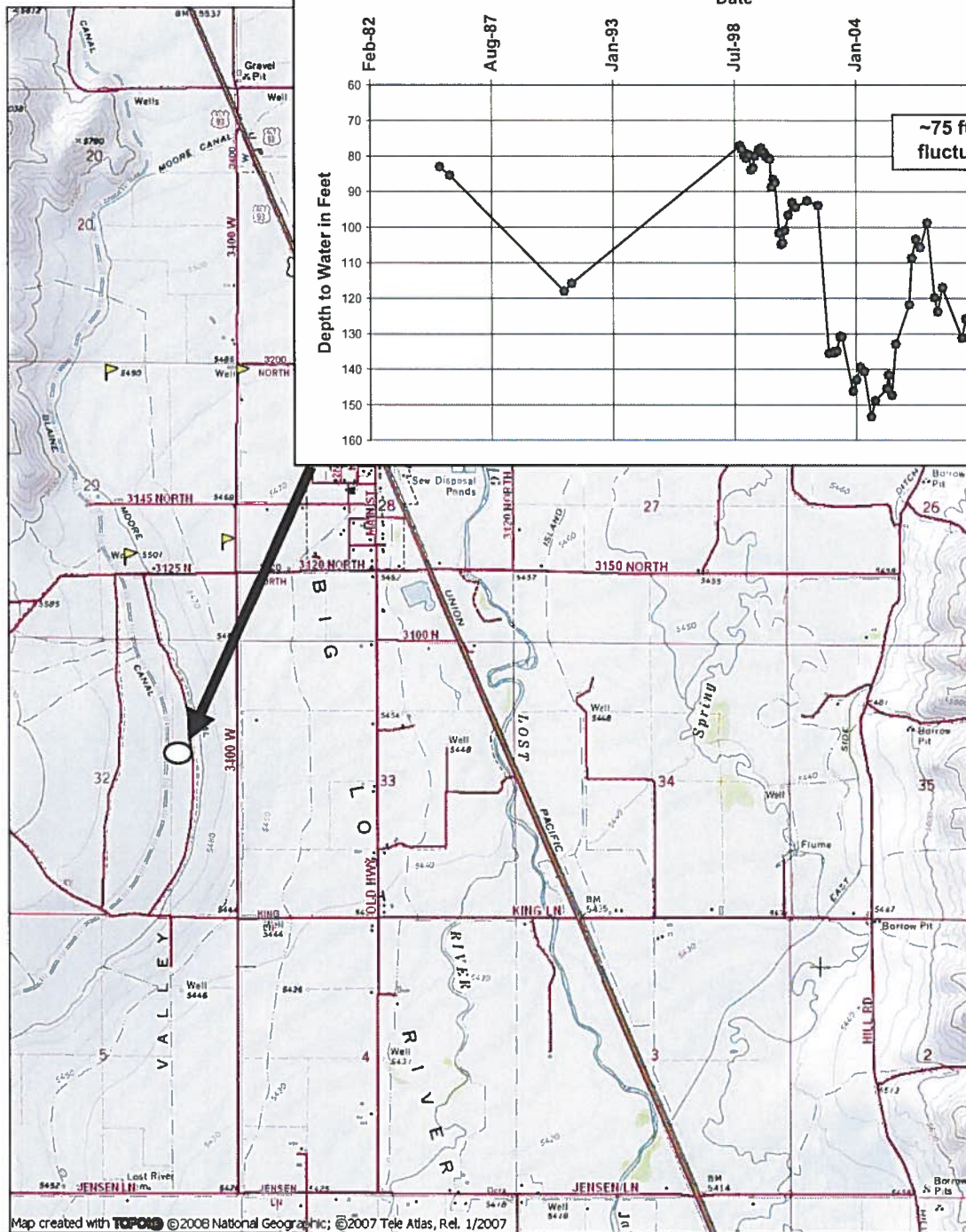


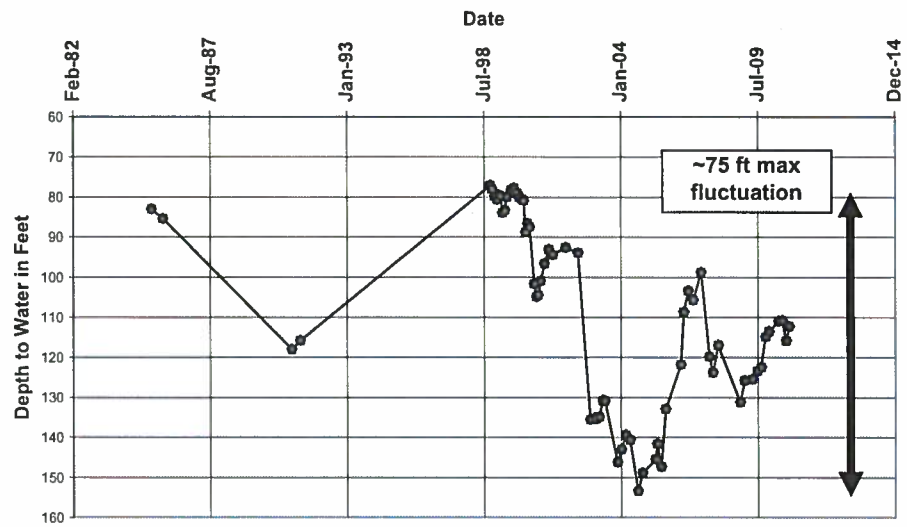
Figure 13 Approximate location of boundaries used in AQTESOLV calculations on a small scale Google Image.



Clearwater
Ground



Well 05n26e-32dba1 Hydrograph



NATIONAL
GEOGRAPHIC

0.0 0.5 1.0 miles
0.0 0.5 1.0 1.5 km

03/27/11

Figure 14 Hydrograph one mile south of area of proposed transfer. Note the isolated spikes caused by the well pump being on at the time of measurement have been removed for clarity. Data from <http://www.idwr.idaho.gov/hydro.online/gwl/default.html>.



ATTACHMENT 1

RECIEPTS FOR WELL WORK TO
LOWER PUMP IN THE NATE
CARPENTER IRRIGATION WELL DUE
TO LOW WATER LEVELS IN 2002



Clearwater Geosciences, LLP
Ground Water Development and Exploration

04/22/2011 00:44 2085278210

THE ARCO ADVERTISER

PAGE 02/03

4/4/2003 2630

PAID
04/14/2003

Carpenter, Nathan
PO Box 307
Arco, ID 83213

Net 10

Pull Pump 120'

Set Pump 140' 10" x 2" x 1 & 3/16" Lane

1,040.00 1,040.00

New 14M 270 1 Stage Bowl

2,100.00 2,100.00

20' New 10" x 2" x 1 & 3/16" Tube & Shaft

500.00 500.00

Used 60 HP Motor

1,600.00 1,600.00

New Panel and Wiring

900.00 900.00

New 12" Cone Strainer

225.00 225.00

New Stretch Assembly

425.00 425.00

TRADE IN CREDIT: (40HP Motor \$600.00 & 150 HP Motor
\$2300.00)

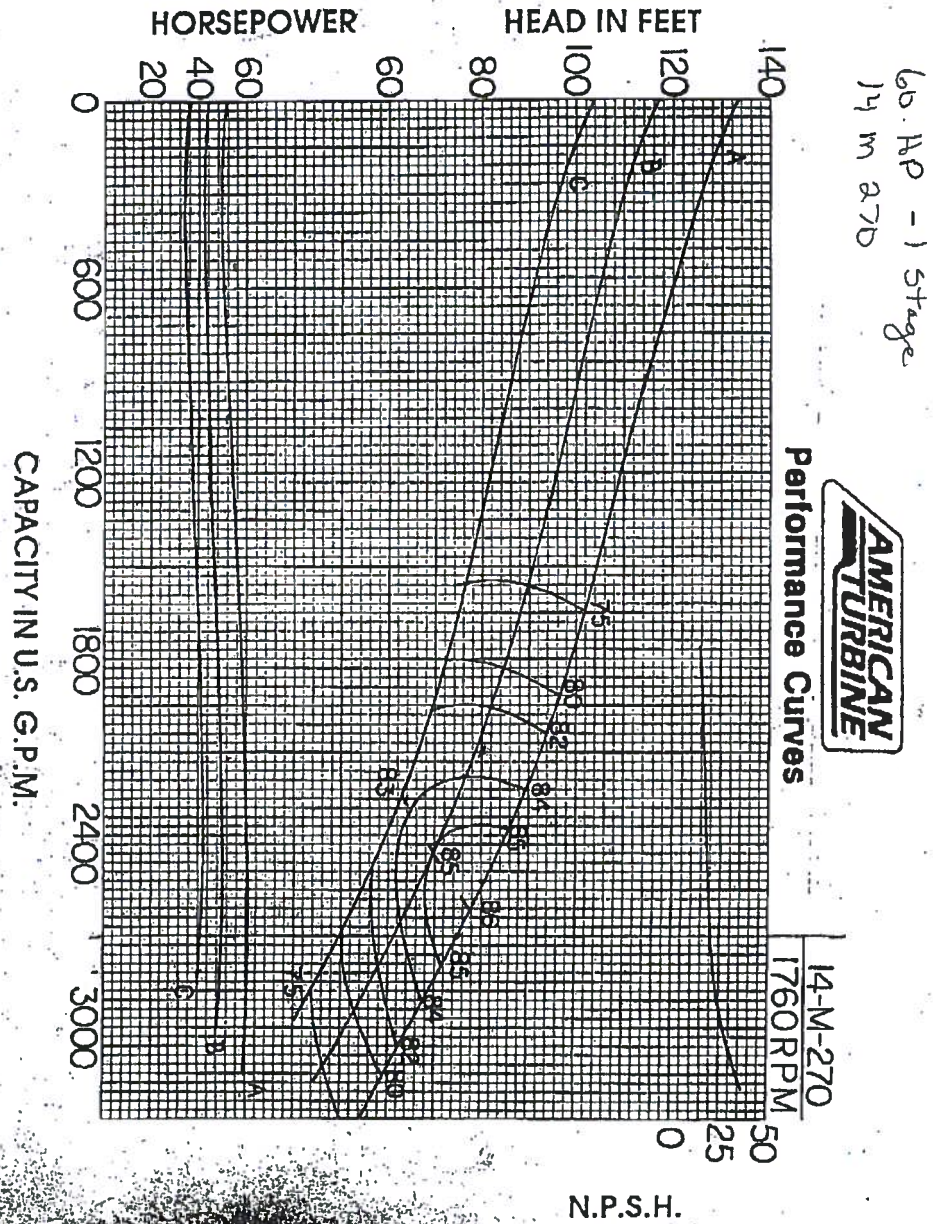
-2,900.00 -2,900.00

Total Work done on well

~~6780.00~~
6790.00

Your Business is Appreciated

\$3,890.00





ATTACHMENT 2

PUMPING TEST ANALYSIS PLOTS

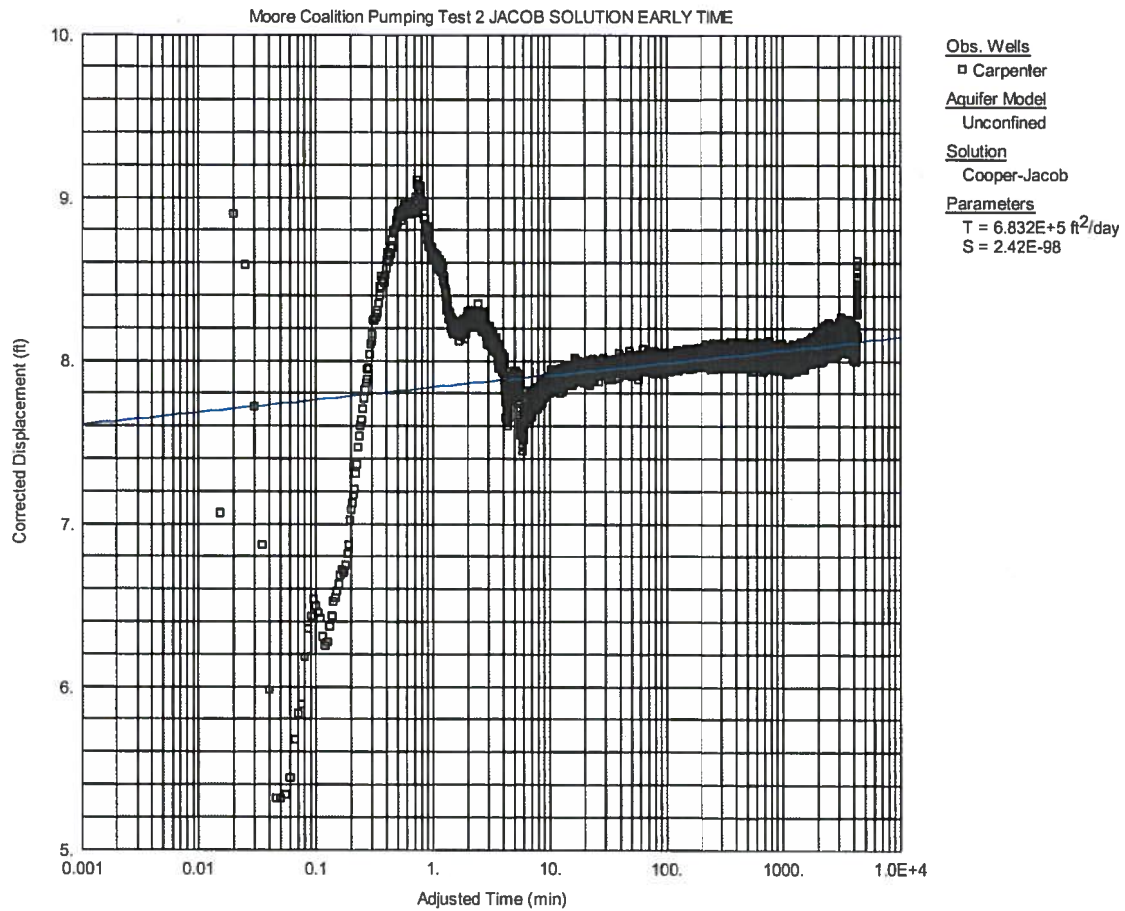


Figure A2-1 Early time match to data using the Cooper-Jacob Solution.

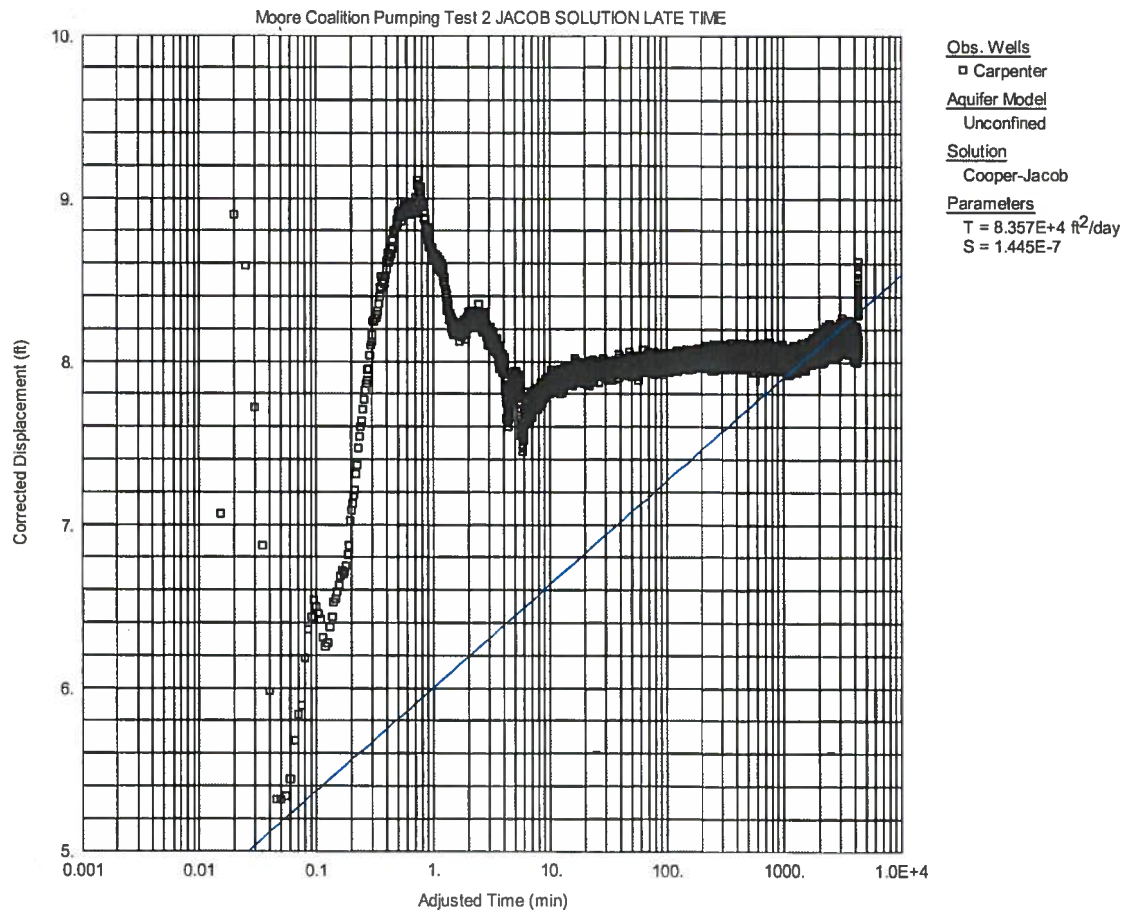


Figure A2-2 Late time match to data using the Cooper-Jacob Solution.



ATTACHMENT 3

IMPACT ANALYSIS



Table A3 -1 Local coordinate system used in AQTESOLV forward solution calculations.

Name	X	Y	Local Coordinates in Feet		
Carpenter Well	0	0			
Babcock Well	-270	-3700			
Loftus Well	1770	-50			
New POD	1700	-3400			
Waddoups	2850	-4000			
Model Corners					
Northwest	-1500	10000			
Southwest	-1500	-15000			
Northeast	13500	10000			
Southeast	13500	-15000			

Table A3-2 Input parameters for AQTESOLV used for impact calculations.

Parameter	Value
Duration in Minutes	308,160 min
Flow rate Proposed POD	5 cfs/2250 gpm
Flow rate for New Babcock POD	3.3 cfs/1500 gpm
Storativity	0.001
Transmissivity	84000 ft ² /day
Aquifer thickness	150 ft
Ratio of Kz to Kr (i.e. vertical to horizontal ratio of hydraulic conductivity)	0.1

Table A3-3 Predicted drawdown from pumping under the two scenarios.

Well Owner Name	Pumping only Proposed POD	Pumping both Proposed POD and Telford increase in Babcock
	Drawdown in feet	
Telford proposed POD	45	62
Loftus	40	60
Carpenter	40	60
Waddoups	41	60
Telford in Babcock	40	60

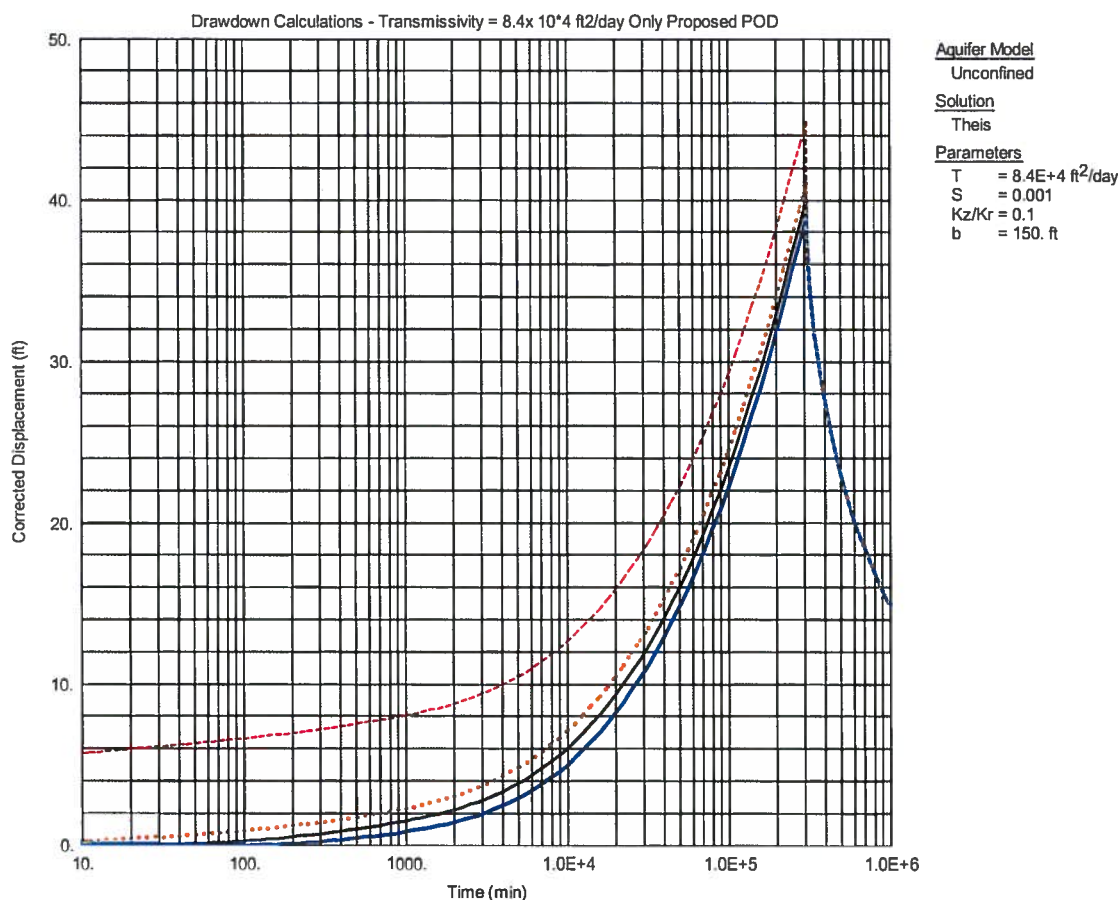


Figure A3-1 Predicted drawdown for pumping 5 cfs at proposed POD.

Key

- | | |
|--------------------|------------------------------|
| Red dashed line | = drawdown in new POD |
| Black solid line | = drawdown in Loftus Well |
| Green line | = drawdown in Carpenter Well |
| Orange dashed line | = drawdown in Waddoups Well |
| Blue line | = drawdown in Babcock Well |

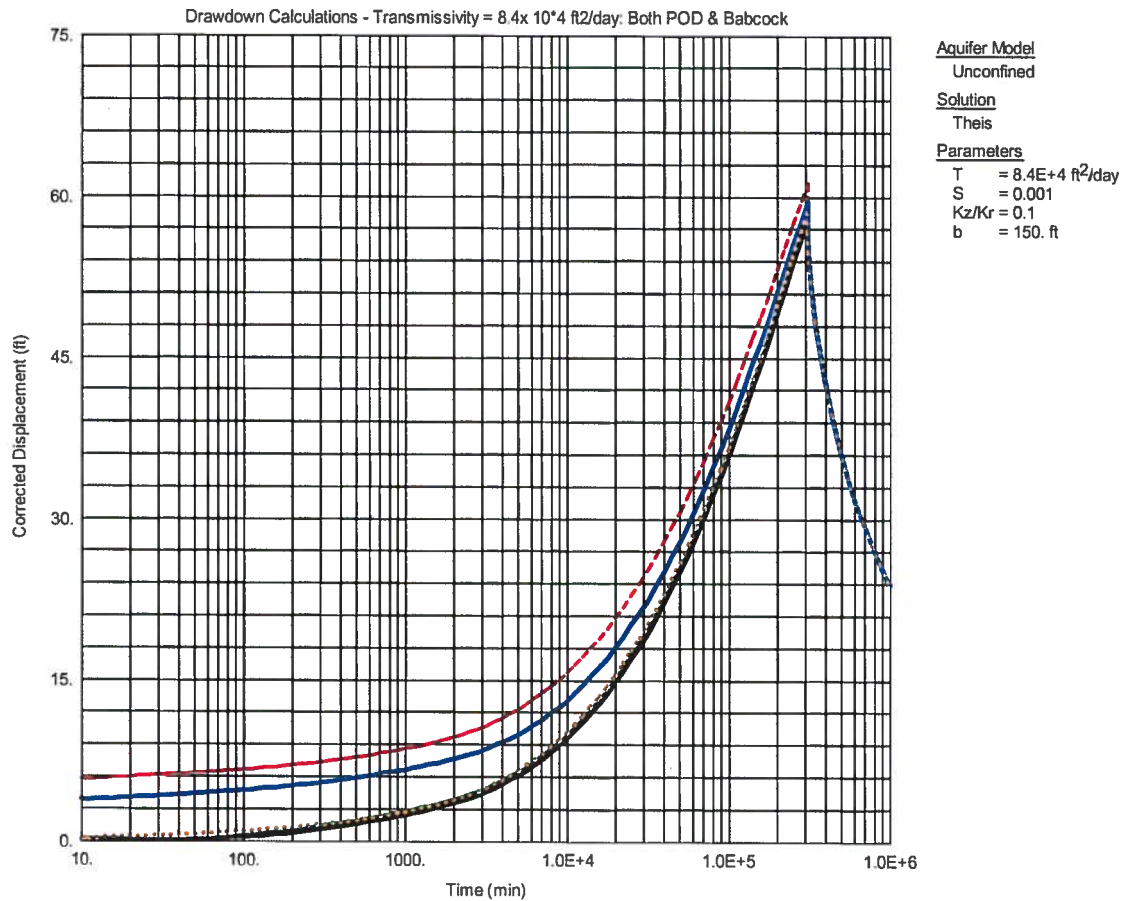


Figure A3-2 Predicted drawdown for pumping 5 cfs at proposed POD and pumping an additional 3.3 cfs at the Babcock well by Telford.

Key

- | | |
|--------------------|------------------------------|
| Red dashed line | = drawdown in new POD |
| Black solid line | = drawdown in Loftus Well |
| Green line | = drawdown in Carpenter Well |
| Orange dashed line | = drawdown in Waddoups Well |
| Blue line | = drawdown in Babcock Well |



ATTACHMENT 4

PUMP CURVES FOR TELFORD UPGRADE OF THE BABCOCK WELL TO BE ON-LINE IN 2011



04/20/2011 05:17 2085273750
Gmail - Pump in Arco

SHARON JENSEN

PAGE 02/04
Page 1 of 1



Mike Telford <telfordsunvalleyseed@gmail.com>

Pump in Arco

1 message

Eric Staley <estaley1@netscape.net>
To: telfordsunvalleyseed@gmail.com

Fri, Mar 18, 2011 at 6:19 PM

Mike

Here is the quote for repairing the pump in Arco. To reach this design, it is necessary to go to 150 H.P. At 150 H.P. the panel will need to be replaced and the transformers checked to see if they will handle the load. This needs to be done by a qualified electrician and the power company. The foundation for this pump is in bad shape, and will cause misalignment with the pump causing premature wear on lineshaft and bearings if not replaced. We are replacing bearings and shaft in the headjoint and one 20' joint of tube and shaft because of this. The cost to do that could possibly be 3 to 5 thousand dollars, depending where the concrete has to come from. You will need to check with a local contractor who would be able to tell you better. I am attaching copies of the pump curve and the estimate for the job. If you have any questions, please call.

Thanks. Eric Staley

2 attachments



scan0019.jpg
1562K



scan0020.jpg
2881K

<https://mail.google.com/mail/?ui=2&ik=219ff7052c&view=pt&q=eric&qs=true&search=query&th=12cch7he2...> 3/24/2011



PAGE 03/04



ESTIMATE/ORDER SHEET

JOB

JOB

DESCRIPTION

LIST

NET

1

TOTAL COST:	\$19,867.00
-------------	-------------

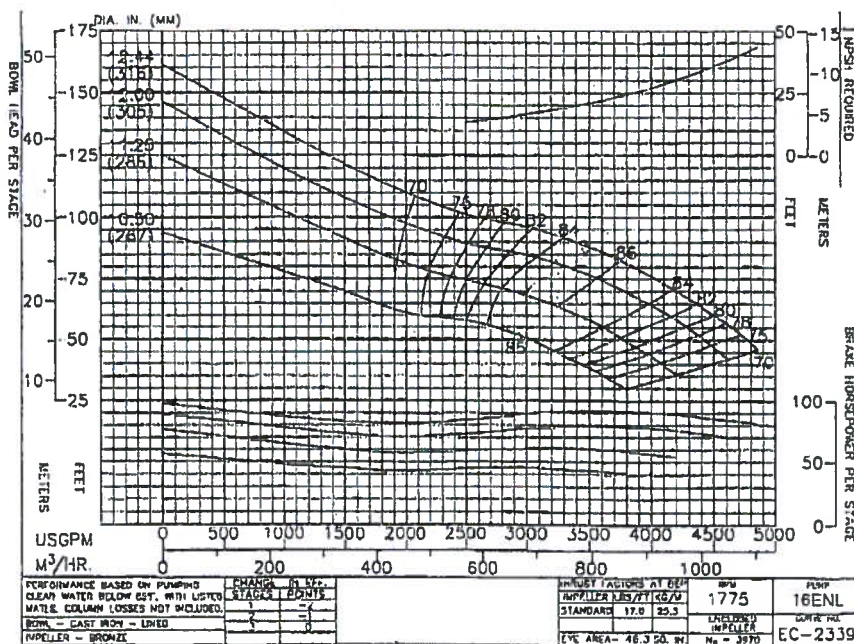
ACCEPTED BY:



16ENL/16NKL

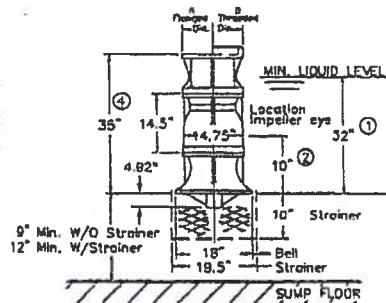
32.70

01-JUNE-2000
NEW SHEET
IMPELLER CURVES



Column	Flow Rate (USGPM)	Flow Rate (M³/HR)	Head (feet)	Head (meters)
16ENL	1775	66.1	32.70	9.75
16NKL	1775	66.1	32.70	9.75

Column	Flow Rate (USGPM)	Flow Rate (M³/HR)	Head (feet)	Head (meters)
16ENL	1775	66.1	32.70	9.75
16NKL	1775	66.1	32.70	9.75



- (1) Minimum submergence required to prevent vortex formation. The submergence needed to provide adequate NPSH to the first stage impeller may be greater or less than shown. The larger of the two values must be used to determine actual minimum allowable submergence.

- (2) Location of eye of first stage impeller. Used to calculate NPSH. This is also the minimum priming submergence. (See note 1).
- (3) Vertical impeller to Bowl running clearance after shaft stretch.
- (4) For Suction Case dimensions see sheets 20.25 and 20.29.

All Specifications Subject to Change Without Notice.

Groundwater Catalog



STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
TRANSFER OF WATER RIGHT
TRANSFER NO. 71254

This is to certify that: MICKELSEN PROPERTIES LLC
 C/O HOLDEN KIDWELL HAHN & CRAPO PLLC
 PO BOX 50130
 IDAHO FALLS ID 83405
 (208)523-0620

has requested a change to the water right(s) listed below. This change in water right(s) is authorized pursuant to the provisions of Section 42-222, Idaho Code. A summary of the changes is also listed below. The authorized change for each affected water right, including conditions of approval, is shown on the following pages of this document.

Summary of Water Rights Before the Proposed Change

<u>Right</u>	<u>Origin/Basis</u>	<u>Priority</u>	<u>Rate</u>	<u>Volume</u>	<u>Acre Limit</u>	<u>Total Acres</u>	<u>Source</u>
34-2330B	WR/Decreed	06/01/1977	1.75 cfs	N/A	122.5	2,025.0	GROUND WATER
34-7121B	WR/Decreed	01/09/1976	3.74 cfs	N/A	316.0	2,025.0	GROUND WATER
34-12376	WR/Decreed	06/01/1977	1.25 cfs	N/A	87.5	2,025.0	GROUND WATER
34-618	WR/Decreed	09/01/1884	3.20 cfs	N/A	N/A	139.0	BIG LOST RIVER
34-7077	WR/Decreed	09/05/1974	8.00 cfs	N/A	200.0	2,025.0	GROUND WATER
34-7080B	WR/Decreed	09/23/1974	5.33 cfs	N/A	286.0	2,025.0	GROUND WATER
34-7120	WR/Decreed	12/17/1975	2.00 cfs	N/A	180.0	2,025.0	GROUND WATER
34-7121A	WR/Decreed	01/09/1976	0.46 cfs	N/A	N/A	286.0	GROUND WATER
34-7092	WR/Decreed	01/14/1975	12.00 cfs	N/A	N/A	635.0	GROUND WATER
34-7179	WR/Decreed	04/06/1982	2.78 cfs	N/A	N/A	2,214.0	GROUND WATER
34-13659	WR/Decreed	06/01/1889	0.97 cfs	N/A	N/A	43.0	BIG LOST RIVER
34-13661	WR/Decreed	06/01/1896	1.00 cfs	N/A	N/A	43.0	BIG LOST RIVER
34-13663	WR/Decreed	04/06/1982	1.93 cfs	381.5 af	109.0	2,138.0	GROUND WATER

Associated Water Rights Also Included in Transfer Approval (Update Conditions)

34-692C	WR/Decreed	07/15/1884	1.60 cfs	N/A	N/A	70.0	BIG LOST RIVER
---------	------------	------------	----------	-----	-----	------	----------------

Purpose of Transfer (Changes Proposed)

<u>Current Number</u>	<u>Split</u>	<u>POD</u>	<u>POU</u>	<u>Add POD</u>	<u>Period of Use</u>	<u>Nature of Use</u>
34-2330B	NO	YES	YES	NO	NO	NO
34-7121B	NO	YES	YES	YES	NO	NO
34-12376	NO	NO	YES	YES	NO	NO
34-618	NO	YES	NO	NO	NO	NO
34-7077	NO	YES	YES	YES	NO	NO
34-7080B	NO	NO	NO	YES	NO	NO
34-7120	YES	YES	YES	YES	NO	NO
34-7121A	NO	YES	YES	YES	NO	NO

SUPPORT DATA

IN FILE # 34-618

EXHIBIT P24

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
TRANSFER OF WATER RIGHT
TRANSFER NO. 71254

Purpose of Transfer (Changes Proposed)

<u>Current Number</u>	<u>Split</u>	<u>POD</u>	<u>POU</u>	<u>Add POD</u>	<u>Period of Use</u>	<u>Nature of Use</u>
34-7092	NO	NO	YES	YES	NO	NO
34-7179	NO	NO	YES	YES	NO	NO
34-13659	NO	NO	YES	NO	NO	NO
34-13661	NO	NO	YES	NO	NO	NO
34-13663	YES	YES	YES	YES	NO	NO

Summary of Water Rights After the Approved Change

<u>Existing Right</u>	<u>New No. (changed portion)</u>	<u>Transfer Rate</u>	<u>Transfer Volume</u>	<u>Acre Limit</u>	<u>Total Acres</u>	<u>New No. (remaining portion)</u>	<u>Remaining Rate</u>	<u>Remaining Volume</u>	<u>Remaining Acre Limit</u>	<u>Remaining Total Acres</u>
34-2330B	34-2330B	1.75 cfs	429.0 af	122.5	1,985.0		N/A	N/A		N/A
34-7121B	34-7121B	3.74 cfs	1106.0 af	316.0	1,985.0		N/A	N/A		N/A
34-12376	34-12376	1.25 cfs	306.3 af	87.5	1,985.0		N/A	N/A		N/A
34-618	34-618	3.20 cfs	N/A	N/A	139.0		N/A	N/A		N/A
34-7077	34-7077	8.00 cfs	700.0 af	200.0	1,985.0		N/A	N/A		N/A
34-7080B	34-7080B	5.33 cfs	1001.0 af	286.0	1,985.0		N/A	N/A		N/A
34-7120	34-13842	0.46 cfs	196.2 af	140.0	1,985.0	34-13841	0.80 cfs	140 af	N/A	40.0
34-7121A	34-7121A	0.46 cfs	169.0 af	286.0	1,985.0		N/A	N/A		N/A
34-7092	34-7092	12.00 cfs	2222.5 af	635.0	1,985.0		N/A	N/A		N/A
34-7179	34-7179	2.78 cfs	1185.5 af	N/A	2,124.0		N/A	N/A		N/A
34-13659	34-13659	0.97 cfs	N/A	43.0	1,985.0		N/A	N/A		N/A
34-13661	34-13661	1.00 cfs	N/A	43.0	1,985.0		N/A	N/A		N/A
34-13663	34-13840	1.26 cfs	248.5 af	71.0	1,985.0	34-13839	0.67 cfs	133 af	38.0	43.0
COMBINED										
TOTALS		42.20 cfs	N/A	2124.0	2124.0		N/A	N/A	N/A	N/A

Rights 34-618, 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-7179, 34-12376, 34-13659, 34-13661, 34-13839, 34-13840, 34-13841 and 34-13842 are subject to the conditions of the Preliminary Order dated 05-31-2006 which has become final in the matter of Application for Transfer 71254.

Detailed Water Right Description(s) attached

Dated this 21st day of July, 20 06


 Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13659**As Modified by Transfer No. 71254**

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13659 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC

PO BOX 438

RIGBY ID 83442

Priority Date: June 01, 1889**Source:** BIG LOST RIVER**Tributary:** SINKS

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	05/01	to 10/15	0.97 CFS	
			0.97 CFS	

LOCATION OF POINT(S) OF DIVERSION:

BIG LOST RIVER

NWSESE

Sec. 4 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0				2.0			305.0
								L 1	L 2			L 3							
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. Rights 34-13659 and 34-13661 when combined shall not exceed the irrigation of 43 acres.
2. The total volume of surface water diverted under water right nos. 34-13659 and 34-13661 shall be limited to 150.5 acre-feet.
3. Whenever water right no 34-13659 is deliverable, fifty-five percent of the flow deliverable (up to 0.53 cfs) shall continue to be delivered into the West Side Canal, and forty-five percent of the flow deliverable (up to 0.44 cfs) can be delivered past the head of the West Side Canal under water right no. 34-13659.
4. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
5. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-13659
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

6. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
7. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
8. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right prior to or in conjunction with beneficial use of associated ground water rights.
9. The period of use for irrigation described above may be extended in seasons of unusual characteristics to a beginning date of 04/20 and an ending date of 10/31 at the discretion of the Director of the Idaho Department of Water Resources.
10. Water delivered through the Moore Diversion, Westside Canal and Timberdome Canal.
11. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21st day of July, 20 06


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7080B
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7080B is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: September 23, 1974

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	to 11/01	5.33 CFS	1,001.0 AF
			5.33 CFS	1,001.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
								L 1	L 2				L 3						
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 286 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7080B
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. Water delivered through the Moore Diversion and Timberdome Canal.
10. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
11. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21st day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-618
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-618 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: September 01, 1884

Source: BIG LOST RIVER

Tributary: SINKS

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	05/01 to	10/15	3.20 CFS	
			3.20 CFS	

LOCATION OF POINT(S) OF DIVERSION:

BIG LOST RIVER NWSESE Sec. 4 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N	26E	4	35.0	36.0	36.0	32.0													139.0
			L 1	L 2															

Total Acres: 139

CONDITIONS OF APPROVAL

1. Rights 34-618 and that portion of ground water right no. 34-7179 associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 0.02 cfs per acre, and shall not exceed a total annual maximum diversion volume of 486.5 af at the field headgate.
2. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
3. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
4. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
5. The period of use for irrigation described above may be extended in seasons of unusual characteristics to a beginning date of 04/20 and an ending date of 10/31 at the discretion of the Director of the Idaho Department of Water Resources.
6. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right prior to or in conjunction with beneficial use of associated ground water rights.
7. Water delivered through the Moore Diversion.
8. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.

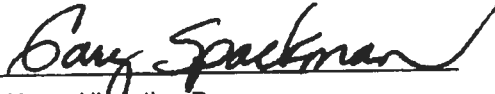
WATER RIGHT NO. 34-618
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

9. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
10. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 20 06


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-2330B
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-2330B is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: June 01, 1977

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	10/31	1.75 CFS	429.0 AF
			1.75 CFS	429.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
								L 1	L 2			L 3							
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 122.5 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

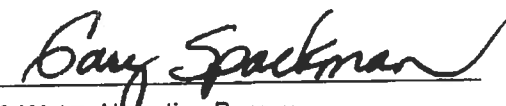
WATER RIGHT NO. 34-2330B
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13661
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13661 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: June 01, 1896

Source: BIG LOST RIVER

Tributary: SINKS

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	05/01 to	10/15	1.00 CFS	
			1.00 CFS	

LOCATION OF POINT(S) OF DIVERSION:

BIG LOST RIVER

NWSESE

Sec. 4 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N 25E 12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N 26E 17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N 26E 18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
						L 1	L 2				L 3						
04N 25E 35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N 25E 36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. Rights 34-13659 and 34-13661 when combined shall not exceed the irrigation of 43 acres.
2. The total volume of surface water diverted under water right nos. 34-13659 and 34-13661 shall be limited to 150.5 acre-feet.
3. Whenever water right no 34-13661 is deliverable, fifty-five percent of the flow deliverable (up to 0.55 cfs) shall continue to be delivered into the West Side Canal, and forty-five percent of the flow deliverable (up to 0.45 cfs) can be delivered past the head of the West Side Canal under water right no. 34-13661.
4. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
5. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-13661
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

6. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
7. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
8. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right prior to or in conjunction with beneficial use of associated ground water rights.
9. The period of use for irrigation described above may be extended in seasons of unusual characteristics to a beginning date of 04/20 and an ending date of 10/31 at the discretion of the Director of the Idaho Department of Water Resources.
10. Water delivered through the Moore Diversion, Westside Canal and Timberdome Canal.
11. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
12. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
13. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7121A
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7121A is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: January 09, 1976

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/15	10/15	0.46 CFS	169.0 AF
			0.46 CFS	169.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N 25E 12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N 26E 17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N 26E 18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0				2.0			305.0
						L 1	L 2			L 3							
04N 25E 35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N 25E 36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 286 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7121A
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. The period of use for the irrigation described in this approval may be extended to a beginning date of 4/1 and an ending date of 10/31 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/15 and after 10/15 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 7/15/2002.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
13. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
14. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
15. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7121B
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7121B is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: January 09, 1976

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	11/01	3.74 CFS	1,106.0 AF
			3.74 CFS	1,106.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N 25E 12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N 26E 17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N 26E 18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
						L 1	L 2			L 3							
04N 25E 35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N 25E 36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 316 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7121B
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 20 06


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7179
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7179 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: April 06, 1982

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01 to	11/01	2.78 CFS	1,185.5 AF
			2.78 CFS	1,185.5 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0				2.0			305.0
								L 1	L 2			L 3							
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0
04N	26E	4	35.0	36.0	36.0	32.0													139.0
			L 1	L 2															

Total Acres: 2124

CONDITIONS OF APPROVAL

1. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
2. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
3. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7179
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

4. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
5. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
6. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
7. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
8. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
9. Water delivered through the Moore Diversion and Timberdome Canal.
10. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
11. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
12. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
13. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21st day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-12376
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-12376 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: June 01, 1977

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01 to	10/31	1.25 CFS	306.3 AF
			1.25 CFS	306.3 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SENWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N 25E 12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N 26E 17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N 26E 18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0				2.0			305.0
						L 1	L 2			L 3							
04N 25E 35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N 25E 36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 87.5 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-12376
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7092
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7092 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: January 14, 1975

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/15	10/15	12.00 CFS	2,222.5 AF
			12.00 CFS	2,222.5 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
							L 1	L 2			L 3								
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 635 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7092
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. The period of use for the irrigation described in this approval may be extended to a beginning date of 4/1 and an ending date of 10/31 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/15 and after 10/15 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 7/15/2002.
10. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
11. The well previously used under Right 34-7092, which will no longer be used, shall be abandoned in a manner which complies with Department well abandonment rules.
12. Water delivered through the Moore Diversion and Timberdome Canal.
13. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
14. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
15. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
16. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13839
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13839 is now described as follows.

Right Holder: EVERETT T ACOR JR
 3196 N YELLOWSTONE HWY
 IDAHO FALLS ID 83401

And

LE ANNE WADDOUPS And
 WADE WADDOUPS
 3221 W 3300 N
 MOORE ID 83255

Priority Date: April 06, 1982

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	to 10/31	0.67 CFS	133.0 AF
			0.67 CFS	133.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER NESWSW Sec. 28 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE					
05N	26E	28																	43.0

Total Acres: 43

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 38 acres within the place of use described above in a single irrigation season.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


 Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13840
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13840 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: April 06, 1982

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	10/31	1.26 CFS	248.5 AF
			1.26 CFS	248.5 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4 Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5 Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21 Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29 Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32 Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32 Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
								L1	L2				L3						
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 71 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-13840
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 20 06


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-7077
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-7077 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: September 05, 1974

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	11/01	8.00 CFS	700.0 AF
			8.00 CFS	700.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0				2.0			305.0
								L 1	L 2			L 3							
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 200 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-7077
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
8. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 20 06


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13841
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13841 is now described as follows.

Right Holder: KURT P ACOR
 PO BOX 63C
 MOORE ID 83255

Priority Date: December 17, 1975

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u> <u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01 to 11/01	0.80 CFS	140.0 AF
		0.80 CFS	140.0 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER NWNWNW Sec. 21 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp Rge Sec	NE				NW				SW				SE				Totals
	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N 25E 35									20.0				20.0				40.0

Total Acres: 40

CONDITIONS OF APPROVAL

1. Water delivered through the Timberdome Canal.
2. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


 Chief, Water Allocation Bureau

WATER RIGHT NO. 34-13842
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-13842 is now described as follows.

Right Holder: MICKELSEN PROPERTIES LLC
 PO BOX 438
 RIGBY ID 83442

Priority Date: December 17, 1975

Source: GROUND WATER

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	11/01	0.46 CFS	196.2 AF
			0.46 CFS	196.2 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER	L2 (NENWNE)	Sec. 4	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	L3 (NENENW)	Sec. 5	Twp 04N	Rge 26E	BUTTE County
GROUND WATER	SWNWNW	Sec. 21	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 29	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SESWNE	Sec. 32	Twp 05N	Rge 26E	BUTTE County
GROUND WATER	SEWSE	Sec. 32	Twp 05N	Rge 26E	BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
03N	25E	12	39.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	31.0	32.0	31.0	32.0	39.0	40.0	36.0	36.0	595.0
03N	26E	17	11.0	25.0			37.0	39.0	13.0	5.0									130.0
03N	26E	18	35.0	39.0	36.0	25.0	38.0	26.0	37.0	40.0	17.0	10.0			2.0				305.0
								L 1	L 2			L 3							
04N	25E	35	40.0	40.0	40.0	40.0									40.0	40.0	40.0	40.0	320.0
04N	25E	36	38.0	40.0	40.0	39.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	39.0	40.0	40.0	39.0	635.0

Total Acres: 1985

CONDITIONS OF APPROVAL

1. This right is limited to the irrigation of 140 acres within the place of use described above in a single irrigation season.
2. Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.
3. Rights 34-618, 34-02330B, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-07077, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2124 acres.
4. Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres) shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

WATER RIGHT NO. 34-13842
As Modified by Transfer No. 71254

CONDITIONS OF APPROVAL

5. Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.
6. The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.
7. If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.
8. The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.
9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.
10. Water delivered through the Moore Diversion and Timberdome Canal.
11. Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.
12. The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.
13. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.
14. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21st day of July, 2006


Chief, Water Allocation Bureau

WATER RIGHT NO. 34-692C
As Modified by Transfer No. 71254

In accordance with the approval of Transfer No. 71254, Water Right No. 34-692C is now described as follows.

Right Holder: EVERETT T ACOR JR
 3196 N YELLOWSTONE HWY
 IDAHO FALLS ID 83401

Priority Date: July 15, 1884

Source: BIG LOST RIVER

Tributary: SINKS

<u>BENEFICIAL USE</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	5/01 to	10/15	1.60 CFS	
			1.60 CFS	

LOCATION OF POINT(S) OF DIVERSION:

BIG LOST RIVER NESESE Sec. 4 Twp 05N Rge 26E BUTTE County

PLACE OF USE: IRRIGATION

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
04N	26E	9					35.0	35.0											70.0

Total Acres: 70

CONDITIONS OF APPROVAL

1. The period of use for irrigation described above may be extended in seasons of unusual characteristics to a beginning date of 04/20 and an ending date of 10/31 at the discretion of the Director of the Idaho Department of Water Resources.
2. Water delivered through the Moore Diversion, Westside Ditch.
3. Right includes accomplished change in place of use pursuant to Section 42-1425, Idaho Code.
4. This partial decree is subject to such general provisions necessary for the definition of the rights or for the efficient administration of the water rights as may be ultimately determined by the Court at a point in time no later than the entry of a final unified decree. Section 42-1412(6), Idaho Code.

This water right is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources.

Dated this 21ST day of July, 2006


 Chief, Water Allocation Bureau

**BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO**

IN THE MATTER OF APPLICATION FOR)	
TRANSFER NO. 71254 IN THE NAME OF)	PRELIMINARY ORDER
MICKELSEN PROPERTIES, LLC)	
_____)	

Mickelsen Properties, LLC filed application for transfer no. 71254 with the Idaho Department of Water Resources (IDWR), seeking to change the place of use and point of diversion for several surface water and ground water rights describing points of diversion located in the Big Lost River Basin. Notice of the application was published, and the application was protested by the Big Lost River Irrigation District and the Big Lost River Water Users Association.

On July 19, 2005, IDWR conducted a hearing for the protests. Kent Foster, attorney at law, appeared on behalf of Mickelsen Properties, LLC (Mickelsen). Kent Fletcher, attorney at law, appeared on behalf of the Big Lost River Irrigation District, and Lawrence Babcock appeared as a representative of the Big Lost River Water Users Association.

On October 7, 2005, Mickelsen petitioned the hearing officer to augment the record in this contested case with a document titled "Water Pumping and Transport Agreement." The agreement purportedly affects water rights sought to be transferred by Mickelsen, and water rights that were the subject of protests against the application for transfer.

The Big Lost River Irrigation District apparently reviewed these documents. Based on this apparent review, on October 4, 2005, the Big Lost River Irrigation District withdrew its protest to the Mickelsen application for transfer.

The mailing certificate attached to Mickelsen's petition to augment the record did not include the Big Lost River Water Users Association. On October 31, 2005, the hearing officer forwarded a copy of the petition to Lawrence Babcock with a cover letter requesting that Babcock file any objection within seven (7) days of receiving the letter. Big Lost River Water Users Association did not file an objection. The hearing officer granted the petition to augment the record.

Following presentation of evidence, and a review of the record, the hearing officer finds, concludes and orders as follows:

FINDINGS OF FACT

1. Application for Transfer No. 71254 proposes a change in the point of diversion and a change in the place of use for three irrigation surface water rights and ten irrigation ground water rights. The general purpose of the application for transfer is to add all the points of diversion to each water right, and to list all of the acres irrigated by all of the water rights as a place of use for each water right.

2. The following is a summary of the current description of the surface water rights sought to be transferred:

RIGHT NUMBER	PRIORITY	SOURCE	FLOW (CFS)	POU (ACRES)	NATURE OF USE	PERIOD OF USE
34-13659	6/1/1889	Surface water	0.97	43	Irrigation	05/01 – 10/15
34-13661	6/1/1896	Surface water	1.00	43	Irrigation	05/01 – 10/15
34-618	9/1/1884	Surface water	3.20	139	Irrigation	05/01 – 10/15

The 43 acres described by water right nos. 34-13659 and 34-13661 as a place of use are identical acres. The 139 acres described as a place of use by water right no. 34-618 are a portion of the 2,214 acres described as a place of use by water right no. 34-7179.

3. The following is a summary of the current description of the ground water rights sought to be transferred:

RIGHT NUMBER	PRIORITY	SOURCE	FLOW (CFS)	POU (ACRES)	NATURE OF USE	PERIOD OF USE
34-2330B	6/1/1977	Ground water	1.75	2025	Irrigation	04/15 – 10/15
34-7077	9/5/1974	Ground water	8.00 ¹	2025	Irrigation	04/15 – 10/15
34-7080B	9/23/1974	Ground water	5.33	2025	Irrigation	04/15 – 10/15
34-7092	1/14/1975	Ground water	12.00	635	Irrigation	04/15 – 10/15
34-7120	12/17/1975	Ground water	1.20 ²	2025	Irrigation	04/15 – 10/15
34-7121A	1/9/1976	Ground water	0.46	286	Irrigation	04/15 – 10/15
34-7121B	1/9/1976	Ground water	3.74	2025	Irrigation	04/15 – 10/15
34-7179	4/6/1982	Ground water	2.78	2214	Irrigation	04/15 – 10/15
34-12376	6/1/1977	Ground water	1.25	2025	Irrigation	04/15 – 10/15
34-13663	4/6/1982	Ground water	1.93 (1.26)	2138	Irrigation	04/15 – 10/15

4. The total flow rate sought to be transferred is equal to 37.77 cfs. The total flow rate will be adjusted later in this decision because the combined flow rate for water right nos. 34-7077 and 34-7120 is limited to 9.26 cfs instead of 10.0 cfs.

¹ The combined flow rate for water right nos. 34-7077 and 34-7120 is limited to 9.26 cfs.

² Water right no. 34-7120 authorizes diversion of 2.0 cfs. The combined flow rate for water right nos. 34-7077 and 34-7120 is limited to 9.26 cfs.

5. The ground water rights sought to be transferred describe all or a portion of the same 2,025 acres identified above. The 2,214 acres described as a place of use for water right no. 34-7179 include 139 acres described as a place of use by water right no. 34-618.

6. The partial decrees for the water rights describing 2,025 acres as a place of use (34-2330B, 34-7077, 34-7080B, 34-7120, 34-7121B, and 34-12376) and the partial decree for water right no. 34-13663 (2,138 acres) each limit the irrigation under the individual right to a fixed number of acres. The partial decree for water right no. 34-7179 does not limit use to a smaller number of acres, but identifies 2,214 acres as the place of use.

7. At the hearing, the protestants stipulated that water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7120, 34-7121A, 34-7121B, and 34-12376 have been decreed by the Snake River Basin Adjudication (SRBA) Court. The Big Lost River Irrigation District has executed delivery agreements with Mickelsen's predecessors for these decreed water rights, and the protestants do not object to the transfer of these water rights as proposed.

8. The Big Lost River Irrigation District admitted that it had executed a carrying agreement for the delivery of water right no. 34-618 and that it did not object to transfer of the water right as proposed by the application for transfer. The Big Lost River Water Users Association continued to object to the proposed transfer of water right no. 34-618.

9. The remaining water rights proposed for transfer and opposed by the Big Lost River Water Users Association are:

Water Right No. 34-618:

Source: Big Lost River

Priority Date: 09/01/1884

Nature of Use: Irrigation

Flow Rate: 3.2 cfs

Season of Use: 5/1 to 10/15

Point of Diversion:

Place(s) of Use

T04N, R26E

Section 4

NESESE, Section 4, T5N, R26E

Description

Acres

Lot 1 (NENE) 35.0

Lot 2 (NWNE) 36.0

SWNE 36.0

SENE 32.0

Total = 139.0

Water Right No. 34-13659:

Source: Big Lost River
 Priority Date: 6/1/1889
 Nature of Use: Irrigation
 Flow Rate: 0.97 cfs
 Season of Use: 5/1 to 10/15
 Point of Diversion: NWSESE, Section 4, T5N, R26E
 Place(s) of Use
 T5N, R26E Section 28

<u>Description</u>	<u>Acres</u>
SWSW	7.0
SESW	36.0
Total =	43.0

Water Right No. 34-13661:

Source: Big Lost River
 Priority Date: 6/1/1896
 Nature of Use: Irrigation
 Flow Rate: 1.0 cfs
 Season of Use: 5/1 to 10/15
 Point of Diversion: NWSESE, Section 4, T5N, R26E
 Place(s) of Use
 T5N, R26E Section 28

<u>Description</u>	<u>Acres</u>
SWSW	7.0
SESW	36.0
Total =	43.0

Water Right No. 34-7179:

Source: Ground Water
 Priority Date: 4/6/1982
 Nature of Use: Irrigation
 Flow Rate: 2.78 cfs
 Season of Use: 4/1 to 11/1
 Point of Diversion: Lot 2 (NENWNE), Section 4, T4N, R26E
 Place(s) of Use: 2,214 acres

Water Right No. 34-13663:

Source: Ground Water
 Priority Date: 4/6/1982
 Nature of Use: Irrigation
 Flow Rate: 1.93 cfs
 Season of Use: 4/1 to 10/31
 Point of Diversion: NESWSW, Section 28, T5N, R26E
 Place of Use: 2,138 acres (limited to 109 acres in a season)

10. At the hearing, Mickelsen stipulated that it only owns a portion of water right no. 34-13663. Mark Mickelsen testified that Mickelsen purchased 1.26 cfs of water right no. 34-13663. The portion it owns has been renumbered as water right no. 34-13840. At the hearing, Mickelsen's ownership of the water right was challenged by Wade Waddoups. The ownership of portions of water right no. 34-13663 will be discussed later in this decision.

11. Transfer no. 71254 proposes the irrigation of 1,985 acres west of Arco on the "Erra Flat" irrigated with water delivered in the Timberdome Canal diverted under water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7120, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13663 and a portion of 34-7179. The 1,985 acres are identified as follows:

Description				Acres
Township 3 North	Range 25 East	Section 12	NENE	39
			NWNE	40
			SWNE	40
			SENE	39
			NENW	40
			NWNW	40
			SWNW	40
			SENW	40
			NESW	31
			NWSW	32
			SWSW	31
			SESW	32
			NESE	39
			NWSE	40
			SWSE	36
			SESE	36
Township 3 North	Range 26 East	Section 17	NENE	11
			NWNE	25
			NENW	37
			NWNW	39
			SWNW	13
			SENW	5
		Section 18	NENE	35
			NWNE	39
			SWNE	36
			SENE	25
			NENW	38
			NWNW	26
			SWNW	37
			SENW	40
			NESW	17
			NWSW	10
			NWSE	2

Description				Acres
Township 4 North	Range 25 East	Section 35	NENE	40
			NWNE	40
			SWNE	40
			SENE	40
			NESE	40
			NWSE	40
			SWSE	40
			SESE	40
Township 4 North	Range 25 East	Section 36	NENE	38
			NWNE	40
			SWNE	40
			SENE	39
			NENW	40
			NWNW	40
			SWNW	40
			SENW	40
			NESW	40
			NWSW	40
			SWSW	40
			SESW	40
			NESE	39
			NWSE	40
			SWSE	40
			SESE	39
			Total Acres	1,985

12. Application for transfer no. 71254 also seeks continued irrigation of 139 acres of land known as "Dad's Place" with water right 34-618 and a portion of 34-7179. The Dad's Place acreage is described as follows:

Description				Acres
Township 4 North	Range 26E	Section 4	NENE	35
			NWNE	36
			SWNE	36
			SENE	32
			Total Acres	139

13. Water right nos. 34-13659 and 34-13661 authorize the diversion of surface water from the Big Lost River. Historically the water diverted under the water rights was delivered into the Moore Canal and subsequently into the west branch of the West Side Canal. The application for transfer proposes diversion of water authorized by water right nos. 34-13659 and

34-13661 into the Moore Canal and ultimate delivery in the Timber Dome Canal. The water would no longer be diverted into the West Side Canal.

14. Percolation losses in the West Side Canal are approximately fifty to sixty percent of the water delivered at the head of the West Side Canal. These seepage losses are assessed against the surface water users whose water rights are diverted into the West Side Canal. Seepage reduces the amount of water that each individual user receives at the field headgate.

15. Removal of a water right from a ditch that loses a significant amount of water to percolation will increase the amount of percolation losses borne by the remaining water users in the ditch. As a result, removal of the surface water from the ditch will decrease each individual water user's available water for use at the field headgate.

16. Because a range of loss percentages was established instead of a specific loss for deliveries of water right nos. 34-13659 and 34-13661 in the West Side Canal, an average loss of fifty-five percent will be assessed against water right nos. 34-13659 and 34-13661. Water right no. 34-13659 authorizes the diversion of 0.97 cfs. Fifty-five percent of 0.97 cfs is 0.53 cfs. Water right no. 34-13661 authorizes the diversion of 1.00 cfs. Fifty-five percent of 1.00 cfs is 0.55 cfs.

17. Water right no. 34-618 is a surface water right appurtenant to 139 acres of land located in Section 4, T4N, R26E, known as "Dad's Place." Water right no. 34-7179 is a ground water right also appurtenant to Dad's Place. In addition to being appurtenant to Dad's Place, ground water right no. 34-7179 is also appurtenant to another 2,075 acres. Many of these acres are located west of Arco in the Erra Flat. The application for transfer proposes that water right no. 34-618 remain only appurtenant to Dad's Place. As a result, water right no. 34-618 cannot be appurtenant to the larger place of use listed by the other water rights.

18. Water right no. 34-7179 can presently only be physically delivered from the well described in the water right to Dad's Place. Water right no. 34-7179 has not been deliverable to irrigate any land other than the 139 acres in Dad's Place.

19. The Snake River Basin Adjudication (SRBA) Court decreed water right no. 34-7179 on November 24, 2000. Despite the fact that water right no. 34-7179 has not been physically deliverable to lands other than the 139 acres at Dad's Place, the decree authorized irrigation of 2,214 acres. Mickelsen filed application for transfer no. 71254 (this application) on May 13, 2004.

20. Water right no. 34-618 has been delivered to the Erra Flat through a carrying agreement with the Big Lost River Irrigation District. IDWR has not previously approved delivery of water right no. 34-618 to the Erra Flat.

21. Water right nos. 34-618 and 34-7179 are appurtenant to the same place of use. In being appurtenant to the same place of use, water right nos. 34-618 and 34-7179 became inextricably linked together.

22. Water right no. 34-13663 is derived from a water right license originally numbered 34-2426. Water right license no. 34-2426 authorized the diversion of 5.0 cfs for irrigation.

23. A claim was filed in the SRBA, numbered 34-2426C. Claim no. 34-2426C asserted the right to divert 7.507 cfs. IDWR staff prepared an SRBA recommendation proposing recognition of 2.5 cfs for claim no. 34-2426C.

24. The SRBA Court ultimately decreed two parts of 34-2426C and assigned new water right numbers to the two parts. The first part was assigned decreed water right no. 34-13663. Decreed water right 34-13663 was issued to Everett T. Acor, Jr. on November 8, 2001. Decreed water right 34-13663 authorized diversion of 1.93 cfs and the irrigation of 2,138 acres. The second part was assigned decreed water right no. 34-13664, authorizing diversion of 0.57 cfs. This application for transfer does not seek to transfer water right no. 34-13664.

25. On September 24, 1999, Everett T. Acor, Jr, Eyleen P. Acor, Kurt Acor, Coralee Acor, Daryn Acor, Shanna Acor ("Acors") and Cannon – Shelley Properties Limited Partnership (Cannon – Shelley) executed a document titled Agreement for Division of Water Rights and Related Property Rights. The agreement was attached to the application for transfer. The agreement documents the sale of various properties and water rights, many of which are the subject of this application for transfer.

26. On May 23, 2003, Cannon – Shelley executed a warranty deed to Mickelsen Properties LLC. The warranty deed conveyed land owned by Cannon – Shelley along with appurtenances, but did not expressly mention water rights. The legal description of the real property conveyed by the deed matches much of the place of use identified in decreed water right no. 34-13663.

27. The document titled Agreement for Division of Water Rights and Related Property Rights expressly sold 1.258 cfs of (claim to) water right no. 34-2426C to Cannon – Shelley. The agreement will be interpreted to have conveyed 1.26 cfs of the 1.93 cfs recognized by decree no. 34-13663 to Cannon – Shelley.

28. At the hearing, Wade Waddoups alleged that he acquired a portion of water right no. 34-13663 by purchasing land from Everett T. Acor in 2002. Wade Waddoups testified that he owns some of the 1.26 cfs of 34-13663 sought to be transferred.

29. Acors sold 1.26 cfs of water right no. 34-13663 to Cannon – Shelley in 1999. The deed conveying real property from Cannon – Shelley to Mickelsen did not expressly include water rights. Nonetheless, even if Cannon – Shelley retained any portion of the 1.26 cfs in the conveyance to Mickelsen, Wade Waddoups would not be entitled to the portion retained because Wade Waddoups purchased from Everett T. Acor not Cannon – Shelley.

30. Because only a portion of water right no. 34-13663 was acquired by Mickelsen, IDWR assigned new water right no. 34-13840 to the portion of water right no. 34-13663 acquired by Mickelsen.

31. In the agreement titled Agreement for Division of Water Rights and Related Property Rights executed by Acors and Cannon – Shelley, Acors sold to Cannon – Shelley all of water right no. 34-7120 (2.0 cfs). Acors also sold all of water right no. 34-7077 (8.0 cfs) to Cannon – Shelley. The combined flow rate for water right nos. 34-7077 and 34-7120 is limited to 9.26 cfs.

32. Application for transfer no. 71254 proposes to transfer 1.2 cfs of water right no. 34-7120. The application for transfer states that the remaining 0.8 cfs of water right no. 34-7120 was “purchased by Mitchell D. Sorensen who agreed with Kurt Acor that the only water right which would be appurtenant to the 40 acres purchased by Sorensen was 0.8 cfs of water right number 34-7120.”

33. Water right nos. 34-7077 and 34-7120, combined together, did not authorize the diversion of 10.0 cfs. Because both Mickelsen and Mitchell D. Sorensen own portions of water right no. 34-7120, Mickelsen’s portion will be assigned water right no. 34-13842 and Sorensen’s portion will be assigned water right no. 34-13841.

34. This application for transfer seeks to increase the number of acres described as a place of use by ground water rights 34-7092 and 34-7121A.

35. The flow rate per acre currently authorized by water right no. 34-7092 is 0.0189 cfs per acre. (12.00 cfs/635 acres). The flow rate per acre sought by combining water rights to allow irrigation of 1985 acres is 0.019 cfs/acre (37.77 cfs/1985 acres). The proposed end flow rate per acre after combining the water rights will be almost identical to the current flow rate per acre for water right no. 34-7092. The proposed end flow rate per acre will be adjusted in the conclusions of law because of limits on the total flow rate diverted by water right nos. 34-7077 and 34-7120, but the adjustment will not significantly affect the proposed end flow rate per acre.

36. The flow rate per acre currently authorized by water right no. 34-7121A is 0.0016 cfs/acre (0.46 cfs/286 acres). The proposed end flow rate per acre will exceed the flow rate per acre for water right 34-7121A.

37. The proposed increase in the place of use acreage for water right nos. 34-7092 or 34-7121A will not increase the flow of water diverted under the rights.

38. Approval of this application for transfer will recognize the ability to divert the cumulative flow rates of all the water rights from a point or points of diversion listed in each water right before the transfer. Construction of new wells at the location of existing points of diversion could increase the flow rate diverted at locations of existing points of diversion. Increases in ground water diversion rates could negatively impact other existing wells in the area of the new construction.

39. Surface water use could increase as a result of this transfer, but appropriate conditions will insure against an increase.

CONCLUSIONS OF LAW

1. Idaho Code § 42-222 states, in pertinent part:

The director of the department of water resources shall examine all the evidence and available information and shall approve the change in whole, or in part, or upon conditions, provided no other water rights are injured thereby, the change does not constitute an enlargement in use of the original right, the change is consistent with the conservation of water resources within the state of Idaho and is in the local public interest as defined in section 42-202B, Idaho Code, the change will not adversely affect the local economy of the watershed or local area within which the source of water for the proposed use originates, in the case where the place of use is outside of the watershed or local area where the source of water originates, and the new use is a beneficial use, which in the case of a municipal provider shall be satisfied if the water right is necessary to serve reasonably anticipated future needs as provided in this chapter. The director may consider consumptive use, as defined in section 42-202B, Idaho Code, as a factor in determining whether a proposed change would constitute an enlargement in use of the original water right. The director shall not approve a change in the nature of use from agricultural use where such change would significantly affect the agricultural base of the local area.

2. The applicant bears the burden of proof for all of the factors listed in Idaho Code § 42-222.

3. Idaho Code § 42-108 states:

The person entitled to the use of water or owning any land to which water has been made appurtenant either by a decree of the court or under the provisions of the constitution and statutes of this state, may change the point of diversion, period of use, or nature of use, and/or may voluntarily abandon the use of such water in whole or in part on the land which is receiving the benefit of the same and transfer the same to other lands, if the water rights of others are not injured by such change in point of diversion, place of use, period of use, or nature of use . . . provided; if the right to the use of such water, or the use of the diversion works or irrigation system is represented by shares of stock in a corporation or if such works or system is owned and/or managed by an irrigation district, no change in the point of diversion, place of use, period of use, or nature of use of such water shall be made or allowed without the consent of such corporation or irrigation district. . . . Any person desiring to make such change of point of diversion, place of use, period of use, or nature of use of water shall make application for change with the department of water resources under the provisions of section 42-222, Idaho Code. After the effective date of this act, no person shall be authorized to change the period of use or nature of use, point of diversion or place of use of water unless he has first applied for and received approval of the department of water resources under the provisions of section 42-222, Idaho Code.

Injury to Other Water Rights

4. Removal of surface water delivered historically in a canal will increase the delivery loss borne by the water right holders whose water rights continue to be delivered through the losing canal. Removal of the entire flow rate authorized by the applicant's water rights from the canal would injure other water users.

5. The flow rates authorized for diversion under water right nos. 34-13659 and 34-13661 and delivery to the Timberdome Canal must be reduced by fifty-five percent. As a result, whenever water right no. 34-13659 is deliverable, fifty-five percent of the flow deliverable (up to 0.53 cfs) must continue to be delivered into the West Side Canal, and only forty-five percent of the flow deliverable (up to 0.44 cfs) can be delivered past the head of the West Side Canal to the Timberdome Canal under water right 34-13659. Similarly, whenever water right no. 34-13661 is deliverable, fifty-five percent of the flow deliverable (up to 0.55 cfs) must continue to be delivered into the West Side Canal, and only forty-five percent of the flow deliverable (up to 0.45 cfs) can be delivered past the head of the West Side Canal to the Timberdome Canal under this water right no. 34-13661.

6. Construction of new wells at the locations of any of the existing points of diversion should not be authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the application for transfer, whether the construction of and pumping from new wells will injure other water rights.

7. With the limitations described above, other water rights will not be injured.

Enlargement of Use

8. The enlargement standard described by Idaho Code § 42-222 is an enlargement of use of the water right, not an enlargement of the water right.

9. The volume of surface water diverted under water right no. 34-618 must be limited to 486.5 acre feet.

10. The total volume of surface water diverted under water right nos. 34-13659 and 34-13661 shall be limited to 150.5 acre-feet. The combined place of use for water right nos. 34-13659 and 34-13661, standing alone, is limited to 43 acres.

11. If all or a portion of water right nos. 34-7077 and 34-7120 are split apart, the combined flow limitation of 9.26 cfs must be carried with the split. Because 34-7120 is the latest priority water right, and it is being split between Mickelsen and Mitchell D. Sorensen, the flow rate for water right no. 34-7120 must be limited to 1.26 cfs. Mickelsen acknowledged Mitchell D. Sorensen's ownership of 0.8 cfs of water right 34-7120. Mickelsen's portion of water right no. 34-7120 (renumbered as 34-13842) must be limited to 0.46 cfs.

12. Because Mickelsen's portion of water right no. 34-7120 (renumbered as 34-13842) is reduced to 0.46 cfs, the total end flow rate authorized for diversion under the ground water rights is reduced to 37.03 cfs. The combined end flow rate per acre for the ground water rights is equal to 0.0187 cfs per acre. This reduced rate per acre from the rate found in finding of fact no. 35 does not result in an enlargement of use.

13. In addition, the number of acres that can be irrigated solely by Mickelsen's portion of water right no. 34-7120 (renumbered as 34-13842) is limited to 140 acres.

14. IDWR assigned new water right no. 34-13840 to the portion of water right no. 34-13663 acquired by Mickelsen. The number of acres that can solely be irrigated by water right no. 34-13840 must be equal to the proportion of the flow rate acquired by Mickelsen to the total flow rate decreed for water right no. 34-13663 multiplied by the 109 acres described as a place of use by water right no. 34-13663. The proportion is $1.26/1.93 = 0.6528$. Multiplying 109 acres by 0.6528 results in a product of 71 acres. Irrigation solely under water right no. 34-13840 is limited to 71 acres.

15. Should any of the water rights that are the subject of this transfer ever be curtailed as a result of a delivery call, the irrigated place of use for all the water rights must be reduced by the number of irrigated acres authorized to be irrigated by the individual water right.

16. With the limitations described above, the proposed transfer will not result in an enlargement of use.

Local Public Interest

17. Granting flexibility in how water is diverted from the various wells and commingled with surface water for irrigation of Mickelsen's property is in the local public interest.

Conservation of Water

18. The proposed delivery systems are as efficient as the delivery systems in operation prior to the transfer. Requiring that water continue to be delivered for losses in ditches from which water is being removed as set forth in conclusion of law no. 5 will insure that water resources previously relied on by other users will be conserved. Approval of the application for transfer, with appropriate conditions, will result in conservation of the waters of the State of Idaho.

ORDER

IT IS HEREBY ORDERED that application for transfer no. 71254 is **Approved** with the following limitations:

Mickelsen's portion of water right no. 34-7120 (renumbered 34-13842) shall be limited to 0.46 cfs.

IT IS FURTHER ORDERED that the water rights transferred by no. 71254 are subject to the following conditions:

All Water Rights

Use of water under this right will be regulated by a watermaster with responsibility for the distribution of water among appropriators within a water district. At the time of this approval, this water right is within State Water District No. 34.

Rights 34-618, 34-02330B, 34-07077, 34-07080B, 34-07121A, 34-07121B, 34-07092, 34-7179, 34-12376, 34-13659, 34-13661, 34-13840 and 34-13842 when combined shall not exceed the irrigation of 2,124 acres.

The right holder shall maintain a measuring device, or other suitable method of measurement, and lockable controlling works of a type approved by the Department in a manner that will provide the watermaster suitable control of the diversion.

The right holder shall accomplish the change authorized by this transfer within one (1) year of the date of this approval.

Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

All Surface Water Rights

The period of use for irrigation described above may be extended in seasons of unusual characteristics to a beginning date of 04/20 and an ending date of 10/31 at the discretion of the Director of the Idaho Department of Water Resources.

The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right prior to or in conjunction with beneficial use of associated ground water rights.

Water Right no. 34-618

Rights 34-618 and that portion of ground water right no. 34-07179 associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 0.02 cfs per acre, and shall not exceed a total annual maximum diversion volume of 486.5 af at the field headgate.

Water delivered through the Moore Diversion.

Water Right no. 34-13659

Whenever water right no. 34-13659 is deliverable, fifty-five percent of the flow deliverable (up to 0.53 cfs) shall continue to be delivered into the West Side Canal, and forty-five percent of the flow deliverable (up to 0.44 cfs) can be delivered past the head of the West Side Canal under water right no. 34-13659.

The total volume of surface water diverted under water right nos. 34-13659 and 34-13661 shall be limited to 150.5 acre-feet.

Rights 34-13659 and 34-13661 when combined shall not exceed the irrigation of 43 acres.

Water delivered through the Moore Diversion, Westside Canal and Timberdome Canal.

Water Right no. 34-13661

Whenever water right no. 34-13661 is deliverable, fifty-five percent of the flow deliverable (up to 0.55 cfs) shall continue to be delivered into the West Side Canal, and forty-five percent of the flow deliverable (up to 0.45 cfs) can be delivered past the head of the West Side Ditch under water right no. 34-13661.

The total volume of surface water diverted under water right nos. 34-13659 and 34-13661 shall be limited to 150.5 acre-feet.

Rights 34-13659 and 34-13661 when combined shall not exceed the irrigation of 43 acres.

Water delivered through the Moore Diversion, Westside Canal and Timberdome Canal.

All Water Rights Except 34-618

Should all or any portion of water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-7179, 34-13659, 34-13661, 34-13840, and 34-13842 ever be curtailed as a result of a delivery call, the irrigated place of use for water right nos. 34-2330B, 34-7077, 34-7080B, 34-7092, 34-7121A, 34-7121B, 34-12376, 34-13659, 34-13661, 34-13840, 34-13842 (all describing a place of use of 1985 acres) and water right no. 34-7179 (2124 acres)

shall be reduced by the number of irrigated acres authorized to be irrigated by the individual water right that is curtailed.

Ground Water Rights

Construction of new wells at the location of existing points of diversion is not authorized unless the water right holder obtains approval through an application for transfer, and the Department determines, by considering the transfer, whether the construction of and pumping from new wells will injure other water rights.

Rights 34-2330B, 34-07077, 34-07080B, 34-07092, 34-07121A, 34-07121B, 34-12376, 34-13840, 34-13842, and that portion of ground water right no. 34-07179 not associated with water right no. 34-618, when combined, shall not exceed a total diversion rate of 37.03 cfs, and shall not exceed a total annual maximum diversion volume of 6,947.5 af at the field headgate.

The right holder shall make full beneficial use of all surface water rights available to the right holder for irrigation of the lands authorized to be irrigated under this right. The right holder shall limit the diversion of ground water under this right to those times when the surface water supply is not available or the surface water supply is not reasonably sufficient to irrigate the place of use authorized under this right.

If the surface water right(s) appurtenant to the place of use is sold, transferred, leased or used on any other place of use, this right to divert groundwater shall not be used without an approved transfer pursuant to Section 42-222, Idaho Code, or approval of the Department if a transfer is not required.

This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 3.5 afa per acre at the field headgate for irrigation of the lands above.

Water delivered through the Moore Diversion and Timberdome canal.

Water Right no. 34-2330B

This right is limited to the irrigation of 122.5 acres within the place of use described above in a single irrigation season.

Water Right no. 34-7080B

This right is limited to the irrigation of 286 acres within the place of use described above in a single irrigation season.

Water Right no. 34-7077

This right is limited to the irrigation of 200 acres within the place of use described above in a single irrigation season.

Water Right no. 34-7092

This right is limited to the irrigation of 635 acres within the place of use described above in a single irrigation season.

The period of use for the irrigation described in this approval may be extended to a beginning date of 4/1 and an ending date of 10/31 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/15 and after 10/15 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 7/15/2002.

The well previously used under Right 34-7092, which will no longer be used, shall be abandoned in a manner, which complies with Department well abandonment rules.

Water Right no. 34-7121A

This right is limited to the irrigation of 286 acres within the place of use described above in a single irrigation season.

The period of use for the irrigation described in this approval may be extended to a beginning date of 4/1 and an ending date of 10/31 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/15 and after 10/15 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 7/15/2002.

Water Right no. 34-7121B

This right is limited to the irrigation of 316 acres within the place of use described above in a single irrigation season.

Water Right no. 34-12376

This right is limited to the irrigation of 87.5 acres within the place of use described above in a single irrigation season.

Water Right no. 34-13839 (Unchanged Split)

This right is limited to the irrigation of 38 acres within the place of use described above in a single irrigation season

Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication Court at a point in time no later than the entry of the final unified decree.

Water Right no. 34-13840

This right is limited to the irrigation of 71 acres within the place of use described above in a single irrigation season.

Water Right no. 34-13841 (Unchanged Split)

Water delivered through the Timberdome canal.

Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication Court at a point in time no later than the entry of the final unified decree.

Water Right no. 34-13842

This right is limited to the irrigation of 140 acres within the place of use described above in a single irrigation season.

DATED this 31st day of May, 2006.



GARY SPACKMAN
Hearing Officer

BRIAN D. HIGGS, P.G.
Licensed Professional Geologist
Office Phone (208)522-0399
Cell Phone (208)604-1280



6330 West 33rd South
Idaho Falls, ID 83402-5641
brian@waterwellconsultants.com
Fax: (208)542-0399

September 8, 2010

Mike Telford
1800 N. 1550 W.
Paul, Idaho 83347

RE: PROPOSED WELL LOCATION

Dear Mr. Telford,

As you requested I have reviewed all available data within the area of your proposed well location. The collected and reviewed data included all known hydrogeologic reports, well and pumping information, and water levels. In addition, I have measured a series of wells two (2) times each during the 2010 irrigation season and will measure each well once more. This letter briefly summarizes the results of the review.

The aquifer parameters vary within the basin. Based on the data from surrounding wells an estimate of the transmissivity at approximately 100,000 ft²/day is most likely in the area of your proposed well. At that transmissivity the drawdown within 1 mile of the well location will be approximately 1 ft. When coalesced with the drawdown curves of other wells in the area the effect of your new well will be undetectable.

It is my professional opinion that the best location of the proposed well is equidistant from all other wells in the area; thereby allowing each well maximum draw from the localized aquifers. The attached map illustrates the ideal location. However, since the ideal location is in a cultivated field I suggest you locate the well along the county road as indicated.

I have prepared a report with all the data and analyses defending my position. I am prepared for the hearing and am available at the scheduled time. All expert witnesses will be using the same data, since there is no more available, and must come to the same conclusion. Your well will have no detectable effect.

Please do not hesitate to contact me with clarifications or questions.

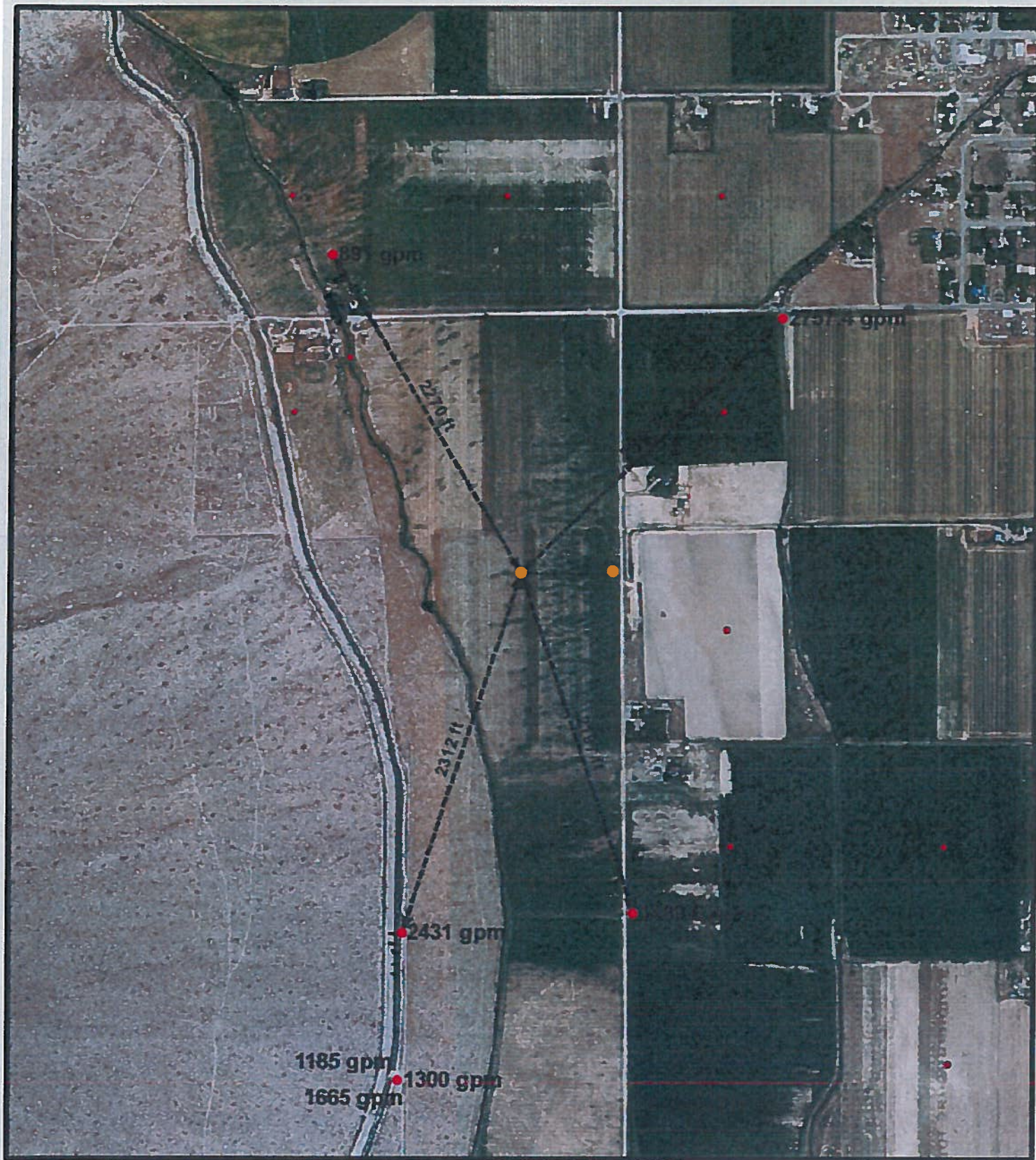
Sincerely,

Brian Higgs P.G.

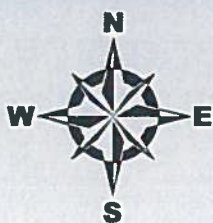
Brian Higgs, P.G.

EXHIBIT P26

Ideal Location for New Well- Mike Telford



- Measured Irrigation Wells
- Proposed New Well
- Domestic Well
- ↔ Distances



0 0.1 0.2 0.3 0.4 0.5 Miles

Idealized location based on drawdown effects on irrigation wells currently in use. Proposed well is equidistant surrounding wells. Dashed line towards 3400W shows range of possible locations based on ease of access.

USE TYPEWRITER OR
BALL POINT PEN

State of Idaho
Department of Reclamation

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer
within 30 days after completion or abandonment of the well.

1. WELL OWNER 17040218

Name City of Moore

Address Moore, Idaho

Owner's Permit No. 17040218

7. WATER LEVEL 14' 8" Department of Reclamation

Static water level 18' feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. flow

Temperature 48 ° F. Quality

Artesian closed-in pressure p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

2. NATURE OF WORK Well # 1

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
<u>44.5</u>	<u>21' 10"</u>	<u>6</u>

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test

☒ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 12 inches Total depth 174 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
<u>.250</u> inches	<u>12</u> inches	<u>+ 1</u> feet	<u>174</u> feet

Was a packer or seal used? ☐ Yes ☒ No

Perforated? ☒ Yes ☐ No

How perforated? ☐ Factory ☒ Knife ☐ Torch

Size of perforation 2 1/2 inches by 3/16 inches

Number	From	To
<u>341</u> perforations	<u>125</u> feet	<u>147</u> feet
<u>210</u> perforations	<u>147</u> feet	<u>151</u> feet
	<u>154</u> feet	<u>171</u> feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name

Type Model No.

Diameter Slot size Set from feet to feet

Diameter Slot size Set from feet to feet

Gravel packed? ☐ Yes ☒ No Size of gravel

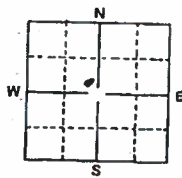
Placed from feet to feet

Surface seal? ☒ Yes ☐ No To what depth 18 feet

Material used in seal ☒ Cement grout ☐ Pudding clay

6. LOCATION OF WELL

Sketch map location must agree with written location.



34
County Butte

SE 1/4 NW 1/4 Sec. 28, T. 5 N. R. 26 E/W

10.

Work started Nov. 3, 1969 finished Nov. 20, 1969

11. DRILLER'S CERTIFICATION 3024

This well was drilled under my supervision and this report is true to the best of my knowledge.

Andrew Well Drilling Contractors 5

Driller's or Firm's Name

Number

1268 E. 17th St. Idaho Falls, Idaho 83401

Address

Andrew F. Andrew

1 - 27 - 70

Signed By

Date

USE ADDITIONAL SHEETS IF NECESSARY

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Reclamation Engineer
within 30 days after completion or abandonment of the well.1. WELL OWNER 17040218Name City of MooreAddress Moore, IdahoOwner's Permit No. none

7. WATER LEVEL

Static water level 17 feet below land surfaceFlowing? ☐ Yes ☒ No G.P.M. flow _____Temperature 48 ° F. Quality _____

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

2. NATURE OF WORK

Well #2

☒ New well ☐ Deepened ☐ Replacement☐ Abandoned (describe method of abandoning)

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
450	5'	3 1/2

30124

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Test☒ Municipal ☐ Industrial ☐ Stock

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 12 Inches Total depth 140 feetCasing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
<u>.250</u> Inches	<u>12</u> Inches	<u>+ 1</u> feet	<u>140</u> feet
_____ Inches	_____ Inches	_____ feet	_____ feet
_____ Inches	_____ Inches	_____ feet	_____ feet
_____ Inches	_____ Inches	_____ feet	_____ feet
_____ Inches	_____ Inches	_____ feet	_____ feet

Was a packer or seal used? ☐ Yes ☒ NoPerforated? ☒ Yes ☐ NoHow perforated? ☐ Factory ☒ Knife ☐ TorchSize of perforation 2 1/2 Inches by 3/16 Inches

Number	From	To
<u>500</u> perforations	<u>100</u> feet	<u>140</u> feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☒ No

Manufacturer's name _____

Type _____ Model No. _____

Diameter _____ Slot size _____ Set from _____ feet to _____ feet

Diameter _____ Slot size _____ Set from _____ feet to _____ feet

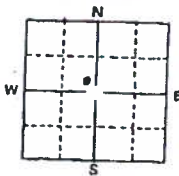
Gravel packed? ☐ Yes ☒ No Size of gravel _____

Placed from _____ feet to _____ feet

Surface seal? ☒ Yes ☐ No To what depth 18 feetMaterial used in seal ☒ Cement grout ☐ Puddling clay

6. LOCATION OF WELL

Sketch map location must agree with written location.

34
County Butte

SE 1/4 NW 1/4 Sec. 28, T. 5, N. 5, R. 26 E. 11

10.

Work started December 17, 1969 finished Dec. 31, 1969

11. DRILLER'S CERTIFICATION (3025)

This well was drilled under my supervision and this report is true to the best of my knowledge.

Andrew Well Drilling Contractors 5
Driller's or Firm's Name Number1268 E. 17th St. Idaho Falls, Idaho 83401
AddressSigned By Andrew Well Drilling Contractors I-27-70
Date

AF Pumped in Nearby Wells

POD	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
5N 26E 22 NWNENE	94	308	286	0	135	614	380	886	799	
5N 26E 22 NWNENW	3	309	90	0	62	121	125	271		
5N 26E 22 NWNESW	119	229	219	142	131	193	199	298	318	
5N 26E 22 SWNNWNW	12	312	219	0	53	553	280	631		
5N 26E 22 SWNWSE	253	287	280	237	254	237	255	177	324	
5N 26E 22 SWNWSE	253	287	280	237	253	255	177	324		
5N 26E 27 NWNWNE	85	384	0	0	0	0	0			
5N 26E 27 NWSWSW	0	0	0	0	0	468	621	579		
5N 26E 27 SWSWSW	366	1,678	2,424	758	832	1,943	1,419	1,417	971	
5N 26E 28 NESWSW	267	718	997	0	95	605	622	1,157	1,428	
5N 26E 28 NWNWNW	507	529	605	0	171	403	237	324	357	
5N 26E 29 NENWNE	22	164	103	0	0	160	288	521	551	
5N 26E 32 SESESE		2,584	692	357	213	966	1,879	1,561	1,904	1,447
5N 26E 33 NWSWNE	171	465	382	235	69	128	66			
5N 26E 33 NWSWNE	46	66	96	330	0	90	96	128		
5N 26E 33 SWSENE	142	198	204	120	123	158	177	0		
5N 26E 33 SWSWNW	375	506	0	0	114	277	634	848	1,053	
5N 26E 34 SENWSW	1,415	2,139	4,293							

Arco Water Levels 6/28/10

Site tag	Legal	Depth to			Time	Comments
		Hold	Cut	Water		
A0008050	5N 26E 21 NWSWNW	110.00	30.46	79.54	1136	Oil. Not pumping.
A0010055	Burnett 5N 26E 21 SWNNWNW	77.75	0.00	77.75	1148	No oil. Not pumping. Cascading much water from nearby canal.
A0018617	Babcock 5N 26E 29 SENWSE	75.00	0.00	75.00	1202	No oil. Not pumping.
Pole # 525	5N 26E 32 SENWSE	112.67	0.00	112.67	1220	No oil. Not pumping. No site tag.
A0006772	409 5N 26E 32 SESWNE	120.00	3.89	116.11	1241	Oil. Not pumping.
A0010064	River Place 4N 26E 4 NENWNE	48.24	0.00	48.24	1304	No oil. Pumping.
	4N 26E 4 NWNNWNE	Abandoned.				
A0006776	4N 26E 5 NENENW	Unable to get water level. Pumping very milky water. 1325.				

Arco Water Levels 8/9/10

A0010055	Burnett 5N 26E 21 SWNNWNW	69.30	0.00	69.30	1524	No oil. Not pumping. Cascading much water from nearby canal.
A0018617	Babcock 5N 26E 29 SENWSE	76.61	0.00	76.61	1608	No oil. Not pumping.
A0010064	River Place 4N 26E 4 NENWNE	54.58	0.00	54.58	1304	No oil. Pumping.
A0006772	409 5N 26E 32 SESWNE	119.63	0.00	119.63	1622	No oil. Not pumping.
A0008070	Moss	81.40	0.00	81.40	1540	No oil. Not pumping.
A0010049	PU Ranches 5N 26E 21 NENENW	80.37	0.00	80.37	1553	No oil. Not pumping.
A0006771	512 5N 26E 32 SESWNE	114.70	0.00	114.70	1628	No oil. Not pumping.
A0006778	280	139.95	0.00	139.95	1640	No oil. Not pumping.

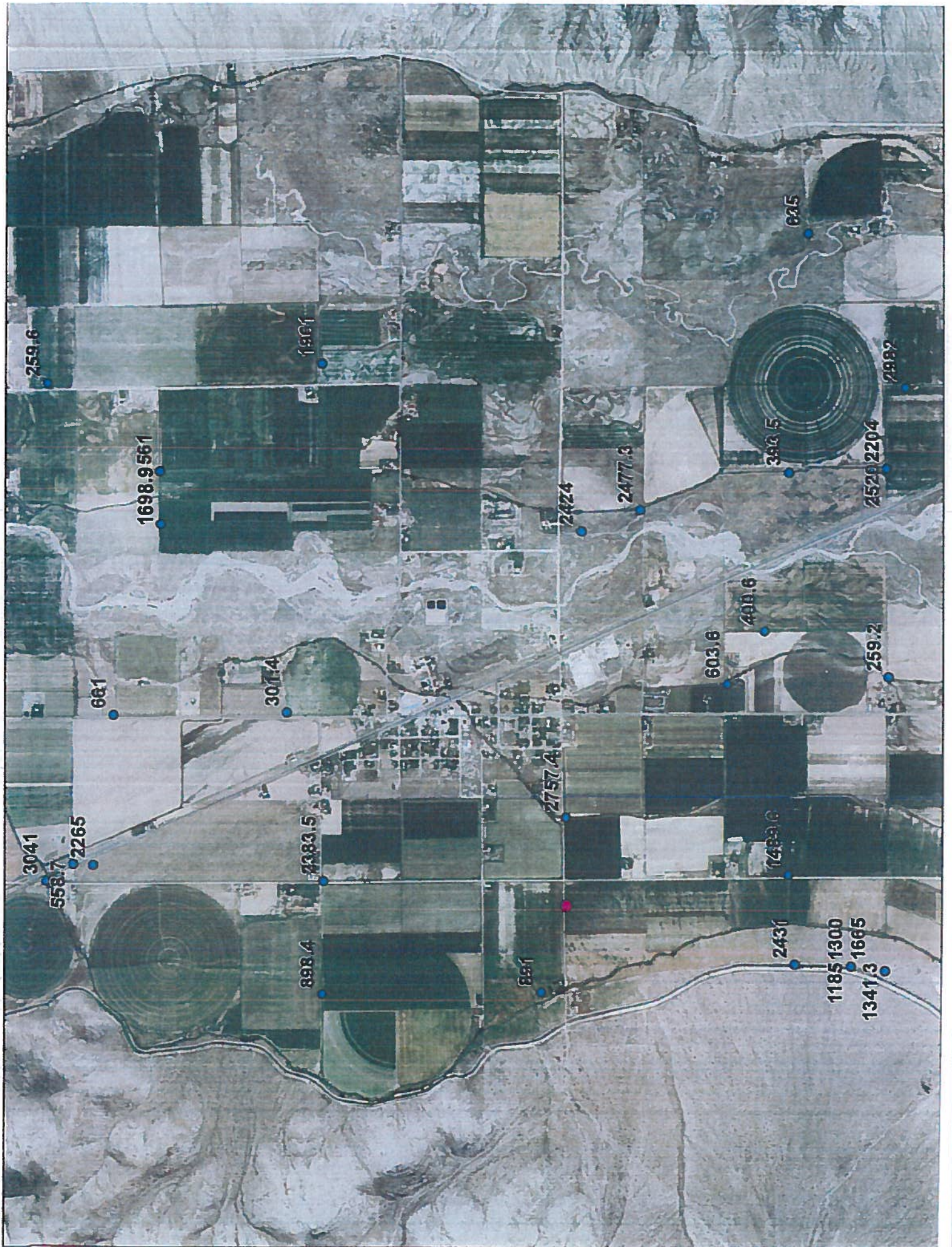
100
980
826
923

Arco Water Levels 9/13/10

A0010055	Burnett 5N 26E 21 SWNNWNW	88.63	10.00	78.63	1050	No oil. Not pumping.
A0018617	Babcock 5N 26E 29 SENWSE	86.69	10.00	76.69	1059	No oil. Not pumping.
A0010064	River Place 4N 26E 4 NENWNE	61.98	10.00	51.98	1144	No oil. Not pumping.
A0006772	409 5N 26E 32 SESWNE	131.48	10.00	121.48	1111	No oil. Not pumping.
A0008070	Moss	90.50	10.00	80.50	1045	No oil. Not pumping.
A0010049	PU Ranches 5N 26E 21 NENENW	90.47	10.00	80.47	1038	No oil. Pumping.
A0006771	512 5N 26E 32 SESWNE	162.00	10.00	152.00	1118	No oil. Pumping. Cascading @ 130'
A0006778	280	183.00	10.00	173.00	1134	No oil. Pumping. Cascading @ 156'
Horse Pasture		524.3	10.00	514.30	1226	TD = 602-10. Likely drilled to 600 filled in 8'. Soft bottom.

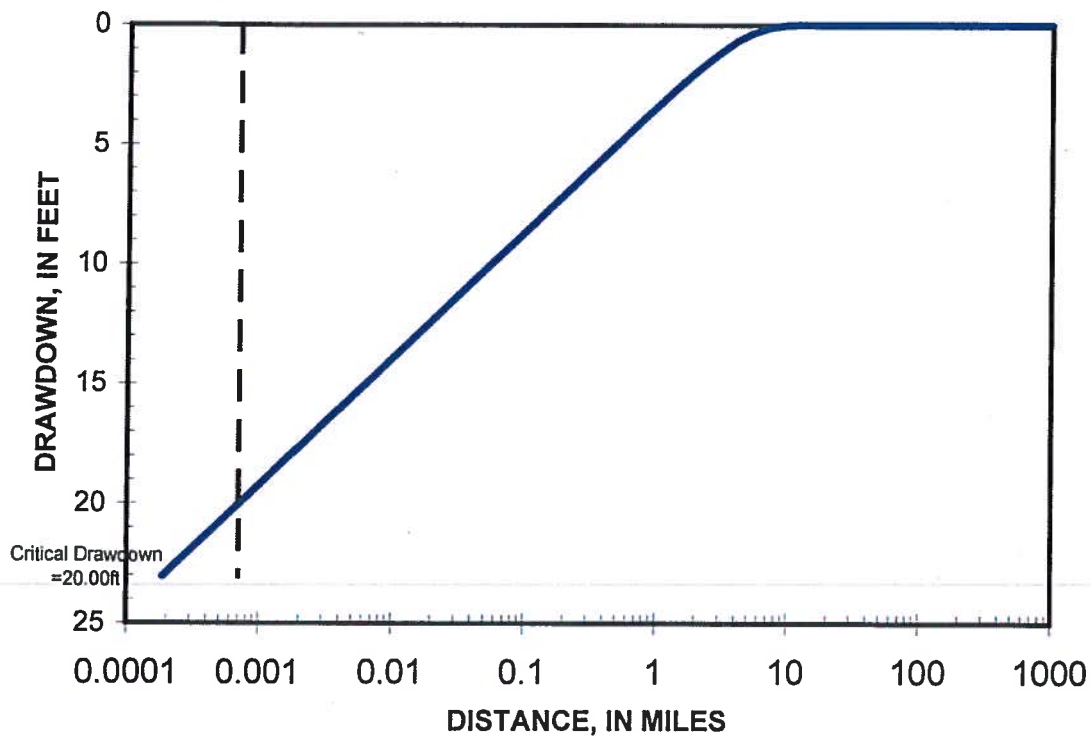
Arco Water Levels Table

	6/28/2010	8/9/2010	9/13/2010
Burnett	77.75	69.30	78.63
Babcock	75.00	76.61	76.69
River Place	48.24*	54.58*	51.98
409	116.11	119.63	121.48
Moss		81.40	80.50
PU Ranches		80.37	80.47*
512		114.70	152.00*
280		139.95	173.00*



AF Pumped in Nearby Wells

POD	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
5N 26E 22 NWNENE	94	308	286	0	135	614	380	886	799	
5N 26E 22 NWNENW	3	309	90	0	62	121	125	271		
5N 26E 22 NWNESW	119	229	219	142	131	193	199	298	318	
5N 26E 22 SWNWNW	12	312	219	0	53	553	280	631		
5N 26E 22 SWNWSE	253	287	280	237	254	237	255	177	324	
5N 26E 22 SWNWSE	253	287	280	237	253	255	177	324		
5N 26E 27 NWNWNE	85	384	0	0	0	0	0			
5N 26E 27 NWSWSW	0	0	0	0	0	468	621	579		
5N 26E 27 SWSWSW	366	1,678	2,424	758	832	1,943	1,419	1,417	971	
5N 26E 28 NESWSW	267	718	997	0	95	605	622	1,157	1,428	
5N 26E 28 NWNWNW	507	529	605	0	171	403	237	324	357	
5N 26E 29 NENWNE	22	164	103	0	0	160	288	521	551	
5N 26E 32 SESESE		2,584	692	357	213	966	1,879	1,561	1,904	1,447
5N 26E 33 NWSWNE	171	465	382	235	69	128	66			
5N 26E 33 NWSWNE	46	66	96	330	0	90	96	128		
5N 26E 33 SWSENE	142	198	204	120	123	158	177	0		
5N 26E 33 SWSWNW	375	506	0	0	114	277	634	848	1,053	
5N 26E 34 SENWSW	1,415	2,139	4,293							



Q = 2500 gpm
 S = 0.02 d'less
 T = 33422 ft²/d
 Time = 0.4 years

	Min	Max	
◀ ▶	0.1	0.4	
◀ ▶	500	5000 150000 g/d/ft	
◀ ▶	5	200 20053 ft ² /d	

Radius, mil	Radius, ft	Drawdown
0.000189	1	23.05724
0.000246	1	22.45598
0.00032	2	21.85472
0.000416	2	21.25346
0.000541	3	20.6522
0.000703	4	20.05094
0.000914	5	19.44968
0.001188	6	18.84842
0.001545	8	18.24716
0.002008	11	17.64589
0.002611	14	17.04463
0.003394	18	16.44337
0.004413	23	15.84211
0.005736	30	15.24085
0.007457	39	14.63959
0.009694	51	14.03833
0.012603	67	13.43707
0.016383	87	12.83581

Critical Drawdown = 20 ft

Distance	Critical Drawdown = 20.00ft
0.000703	0
0.000703	23.05724

0.021298	112	12.23454
0.027688	146	11.63328
0.035994	190	11.03202
0.046793	247	10.43076
0.06083	321	9.8295
0.079079	418	9.228239
0.102803	543	8.626978
0.133644	706	8.025717
0.173737	917	7.424456
0.225859	1,193	6.824862
0.293616	1,550	6.224752
0.381701	2,015	5.625433
0.496211	2,620	5.027451
0.645075	3,406	4.431721
0.838597	4,428	3.839777
1.090176	5,756	3.254176
1.417229	7,483	2.679137
1.842398	9,728	2.121505
2.395117	12,646	1.592078
3.113652	16,440	1.107045
4.047748	21,372	0.688571
5.262072	27,784	0.362117
6.840694	36,119	0.146862
8.892902	46,955	0.039427
11.56077	61,041	0.005421
15.029	79,353	0.000247
19.53771	103,159	0
25.39902	134,107	0
33.01872	174,339	0
42.92434	226,641	0
55.80164	294,633	0
72.54214	383,022	0
94.30478	497,929	0
122.5962	647,308	0
159.3751	841,500	0
207.1876	1,093,951	0
269.3439	1,422,136	0
350.147	1,848,776	0
455.1911	2,403,409	0
591.7485	3,124,432	0
769.273	4,061,762	0
992.3622	5,239,673	0

Russell Babcock

2001			696.71 cfs	
2002	194 cfs	351 cfs	545.38 cfs	
2003	168 cfs	169 cfs	336.71	74 cfs
2004	273 cfs	274 cfs	547.01 cfs	70 cfs
2005	49 cfs	49 cfs	98.31 cfs	147 cfs
2006	0	0	.08 cfs	487 cfs
2007	91 cfs	0	91.15 cfs	128 cfs
2008	9 cfs	8 cfs	17.45 cfs	201.5 cfs
2009	10 cfs	11 cfs	21 cfs	210.92 cfs
2010	181 cfs	0 cfs	181 cfs	220.84 cfs

EXHIBIT P28



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Technical Response to the Report “Hydrogeologic Assessment of the Telford Lands LLC Transfer” by Water Well Consultants

May 2011

Prepared by

Thomas R. Wood, PhD, PG
Clearwater Geosciences, LLP
1818 East 49th South
Idaho Falls, ID 83404



EXHIBIT P29



Clearwater Geosciences, LLP
Ground Water Development and Exploration

May 25, 2011

Coalition
c/o Nathan Carpenter
PO Box 307
Arco, Idaho 83213

RE: RESPONSE TO TELFORD HYDROGEOLOGIC ASSESSMENT

Dear Mr. Carpenter:

Please find attached my technical response to the report by Telford's consultant regarding the proposed Telford water right transfer #76286.

Please call me if you have any questions.

Respectfully,

A handwritten signature in black ink, appearing to read "Thomas R. Wood".

Thomas R. Wood, PhD, PG





Introduction

Telford Lands, LLC, a corporate farm, hired Water Well Consultants, Inc. (Consultants) to evaluate effects of its transfer application #76286. Consultants prepared an analysis of potential impacts from the Telford Transfer Application and concluded that there wouldn't be any. This report has been prepared for the Moore Coalition as a technical evaluation and response to the Consultants report titled "Hydrogeologic Assessment of the Telford Lands LLC Transfer #76286". It is structured as a direct section by section response to the subject report and it is assumed that the reader has available the Consultants report for reference.

Background

The first section of the Consultants report describes the inability of Telford to divert all of his 37.03 cfs water right. No reason is given as to why Telford cannot simply deepen his existing wells to obtain more water. This is a right enjoyed by all groundwater users in Idaho and, as documented elsewhere, has been employed extensively by scores of domestic and irrigation users in the Big Lost River Valley. The notion that Telford must impact aquifer water levels seven miles from the place of use to "divert his full water rights" is the crux of this contested transfer. Bluntly speaking, this is not true or else the Consultant would have shown evidence of why deepening existing wells or drilling new wells on Telford Land is not possible. The truth is that this transfer is simply an economic convenience that will threaten the livelihood of a dozen or more farms that have been in operation for many decades. To support this statement refer to page 20 of the Said et al, 2003 report, a report often cited by the Consultant. Here it is stated that the 10.44 M³/sec of underground water leaving the Big Lost River System should be captured before it leaves the basin. Moving the water problems near Arco upstream to the Moore area makes no economic sense to anyone other than the applicant. It will cause excessive water level decline and the need to deepen wells in both the Moore and the Arco areas.

The move to export water from the Moore area southward to the Arco area has been ongoing for several years. The long reach of the diversions moving up the Big Lost River Valley to support southern farms is illustrated in Figure 1 (Jensen, 2011). As the aquifer declines and it becomes more expensive for farmers to deepen wells and pay the electrical costs to lift water, they have found it more economically attractive to transfer water rights up valley where the wells are shallower and the depth to water less. The water is pumped from wells into canals and it flows to the place of use often many miles from the point of diversion. This approach is very wasteful of precious groundwater because the water once it is put into a canal is subject to evaporation, transpiration and infiltration. The loss of water in layman's terms is called "shrink" and it is a factor calculated by the canal companies. In some BLR canals the "shrink" is over 40% in the middle of summer. The shrinkages for canals managed by the Big Lost River Canal Company are shown in Figure 1.2. The figure demonstrates the large water losses from canals. The some of the water not lost to evapotranspiration does percolate to the deeper aquifer and some percolates to shallow perched water layers. There are two take away



points from the figure: 1) the proposed transfer will have to pump 30 to 50% more water than need at the place of use just to make up for “shrink”; and 2) Most of the water loss will leak from the canal down gradient of the protestors and not be of any benefit to them. This application is very wasteful of groundwater water resources. As will be shown in this response report, the end result of this water grab will be accelerating ground water mining of the Valley and the loss of agricultural lands and the jobs that go with it. The evidence suggests that if the critical tipping point for the aquifer has not been reached already, we are very close to it.

Towards the end of Background section the Consultant describes the careful consideration of a new well location to minimize impacts to other wells. As will be described in later sections, if the siting approach only partially addresses the physics of ground water flow and the dramatic climatic cycles prevalent in the valley, then the resultant location is meaningless. The proposed well will also be deeper than surrounding wells and drilled using modern drilling and completion techniques. Compared to the old wells in the area, the new Telford well will be much more efficient at extracting water. During droughts the new Telford well will be much more likely to maintain pumpable water than the older neighboring wells.

Published Reports

In the opening paragraph of this section the Consultants make a big deal out of “a limited number of reports describe measured aquifer parameters and that most authors used estimated parameters or parameters calculated from well discharge with little to no water level data”. This statement is incredulous given the fact that the best instrumented and closest pumping test for measuring aquifer parameters is nowhere cited by the Consultants. The 1993 report by Bassick and Jones on a pumping test of a Well Orchard Well is only about a mile from the location of the transfer, yet it is never mentioned. Furthermore, if the Consultant thinks measuring aquifer parameters is so important, then why wasn’t a pumping test conducted on the Babcock well using the new pump with the 150 hp motor? As will be described later the Consultants employed a back calculating method to estimate aquifer parameters, the same approach criticized here. The best approach to use is a combination of aquifer test data and calculations to predict impacts from pumping.

In the second paragraph, a pumping test 4 miles west of Arco is described. As mentioned above, there is at least one test that is much closer and better instrumented than the pumping test the Consultant chose to cite. The Arco pumping test was performed in a well completed in basalt, a material significantly different than the sands, gravels and clays of the aquifer at the transfer location. Mundorf et al., 1964, page 115, states that “Undoubtedly, a part of the “excessive” drawdown was caused by the proximity of negative boundaries”. Nowadays a negative boundary is called a barrier boundary, which as will be discussed in detail later in this text is not accounted for in the Consultants calculations of impact. Another point of interest is that the Consultant describes the low yield of this well at being 25 gallons per minute per foot of drawdown. And he goes on to say that elsewhere in the basin the well yields are more than 350 gpm/ft. Yet at few



pages later in the Consultant's Figure 1, which is cited as an example of the aquifer materials typical of the location for the transfer application, the calculated well yield is even less than the "low" value of 25 gpm/ft! The City of Moore Well is 174 ft deep and penetrates a sequence of valley alluvium just like all the wells of the protestants. During a 6 hour pumping test the Moore City well was pumped at 445 gpm and the drawdown was measured at 21 ft 10 inches, which is a specific yield of 21.4 gpm/ft. This pumping information is recorded on the driller's log for the Moore City Well. One is left wondering where is all the water the Consultants seems to think exists in the Moore area? The simple truth is that it isn't there and it especially isn't there during periods of drought.

In the final paragraph of this section a discussion is provided of water levels in wells showing that water levels typically rise throughout the summer season. Further the astounding statement is made that *"generally speaking, in the BLR Valley if you turn the well on in May the water level will rise throughout the summer months during pumping; exactly opposite of what is expected"*. Indeed. Based on the conservation of mass, the only way to have rising water levels during pumping is for lots of new water to enter the system. Water enters the aquifer of the Big Lost River Valley from river and canal leakage. It is a known fact that water does not always flow in the river and that the canals run dry, once this happens water levels in wells will drop dramatically. However, the Consultants seem to think that water enters the system every year and ignores the fact that droughts are very common, as a matter of fact Crosthwaite et al., 1970 states on page 3 that water shortages occur frequently in the basin. It is a historical fact that droughts occur and we have demonstrated it using historical records of water levels, records of well drilling, receipts for pump work and by computer simulation. Thus, the magic wells with the rising water levels only occur during wet years with plenty of recharge.

Geology

The Consultants starts off this section by stating that it is not necessary to describe the areal geology and that it is suffice to describe the lithology in the area of concern. However the area of concern is not defined. We define the area of concern as that portion of the aquifer supplying water to the protestants wells and under the influence of the proposed transfer POD during drought conditions. A comparison between the Clearwater area of concern (15 sq mi) and the Consultants area of concern (9 sq mi) is given in Figure 1-3.

The well log for the City of Moore is offered as representative of the geology of the area of concern, therefore, we know it is unconsolidated alluvium with characteristically poor water yield as describe earlier. The Consultant states that a typical well is 200 to 250 ft deep. Our investigation has not uncovered any wells deeper than 190 ft in the area of concern. Installing a new well to 250 ft will clearly place the Telford at an advantage over existing users during droughts and provide him with the capability to dry up nearby users.



We argue that the areal geology is very significant for making estimates of the impact from pumping. All the hydrogeological reports we have found describe the Big Lost River Valley aquifer as being located between two mountain ranges and its form is long and narrow. Refer to Figure 2 and 3 taken directly from Crosthwaite, et al., 1970. They both show the long narrow geometry of the basin. Figure 2 is a map view showing the water bearing characteristics of the aquifer. Notice the aquifer goes to zero in the mountain. Figure 3 is a cross section view and it shows the faults that create the aquifer boundaries. Without accounting for the areal geology it is not possible to accurately calculate the longterm impacts from pumping required to approve this application for transfer.

Water Level Hydrographs

The Consultant begins this section with the statement that BLR Valley has been thoroughly studied twice in the past ½ century. This is just barely true as only one complete study has been performed and it started 44 years ago (Crosthwaite et al., 1970). The study after the Borah Peak Quake is hardly worth mentioning and as a matter of fact the Consultant doesn't provide the reference. The Consultant fails to mention that much development has occurred in the Big Lost River Valley since the Crosthwaite Study based on their recommendations (Said et al., 2003, page 8). The Big Lost River Valley is long overdue for a comprehensive hydrology study to ensure proper management of water resources in the area.

In the second paragraph the Consultant mentions the strong correlation between surface water flow and groundwater. As will be seen later, the Consultant fails to consider this fact in his damage analysis.

The Consultant introduces the Hydrograph of Well 05N 26E 23 CDA1, which is located about 3 miles northeast of the location of the transfer application (Figure 4 and 5). Several points are mentioned by the Consultant regarding the hydrograph that do not aid his case; the first is that *"the drought of the 1970's was severe, but did not cause a drop in the aquifer as extreme as the early 1990's and the early 2000's. The reason for this is the increase of ground water rights and pumping post 1970's"*. That is, the massive ground water development that occurred after the glowing technical recommendations made by Crosthwaite et al., 1970 regarding the water availability in the BLR valley. The second statement is *"notice that at the beginning of the droughts the effect of pumping is completely overshadowed by the absence of surface water influx. The minor stair steps on the decline and rise result from the small volumes of water released from Mackay Dam during the irrigation season"*. This is exactly what the Protestants have been saying 1) increasing demand is lowering water levels excessively, and 2) the frequent droughts are now more severe and prolonged then ever before because of over pumping. The only conclusion that can be drawn from the Consultants second comment is that any increased pumping as proposed by the applicant will at a minimum make the problem worse and it is very likely that the ground water system may be pushed past a critical point causing significant damage to all groundwater users. This critical point will occur when the aquifer thins during a drought to the point where the aquifer thickness is insufficient to transport water fast enough to satisfy demand.



Detailed analyses of the Hydrograph of Well 05N 26E 23 CDA1 will help elucidate this point. Two hydrologic periods are defined in Figure 5. The first is where the annual discharge and recharge are more or less in balance and the system is able to recover on an annual basis. The second period is where recharge is insufficient for the water levels to recover and declines increase from one year to the next. Conceptually the aquifer can be thought of as a bathtub that is bailed annually with a large bucket. In the past the annual flow from the spigot was sufficient to refill the bathtub. However, in some years the spigot didn't run and the water levels dropped in a stair step manner. The system wants to come to equilibrium where flow is steady over the rim of the bathtub and as the spigot runs water will flow from the bathtub.

Of major concern is that the even in the last few wet years, the water levels have only recovered to only about half of their former levels. This is the critical point referred to earlier. At some point as more and more demand is placed on the aquifer a point is reached where the aquifer cannot reset and fill the bathtub to the brim as in prior years. Thus, water formerly in storage prior droughts of the past (refer to water level in 2000) is no longer available to help farmers through the next drought. It seems likely that the increased pumping in recent years now exceeds the ability of the surface water to recharge the aquifer even with a few years of strong surface water flux. The levels in wells should be carefully monitored to see if the wet season of 2011 is able to return the aquifer to its former levels. It may be that the combination of over pumping and climate change has compromised the Big Lost River Valley Aquifer's ability to operate in an annual equilibrium state. If so, there is now much less water in storage to help water rights holders through droughts.

Also, of note in the hydrograph of well 05N 26E 23 CDA1 is the maximum water level fluctuation of 75 ft. This is consistent with the maximum water level fluctuation we found in a well much closer to the proposed new point of diversion.

Discussion

This section makes some broad unsupported statements and treats them as facts. For instance, the first paragraph states that "*since the water levels in most wells in the BLR Valley rise throughout the summer determining effects is near impossible.*" It is not clear what this means. Effects of what? It seems that the point is being developed that it is impossible to conduct a pumping test in a viable manner.

The second paragraph extends the discussion of the difficulty of conducting pumping tests where water levels are fluctuating because of the impact on aquifer parameters. The closing statement of the paragraph regarding a senior water right user is incomprehensible and it is not clear what point is being made.

"Even after perfect implementation, if the water level in the senior water right well rises or remains constant, the effect could not be quantified or detected".



Apparently, the notion is that water levels always rise throughout every irrigation season. This not true, we have presented much evidence to support the effects of droughts on water levels and the Consultant also provides evidence that water levels do not always rise during the irrigation season (see his Figure 3 Hydrograph of 05N 26E 23 CDA1). Although the pumping during wet seasons appears to have reduced aquifer storage, the most damage will occur during droughts when water levels are declining during pumping. It makes little difference how much water is available in wet years, yet the Consultant continues to focus on this.

The third paragraph continues with the author's tendency to make broad unsupported statements. For instance, a pumping test conducted off the irrigation season would determine aquifer parameters at that time, but the author jumps to the conclusion that the results would be completely different at a later time. This statement is not backed up and indeed the statement that the results are "completely" different is not correct. Just because of an influx of surface water the geologic formation and the well construction do not change. What does change is the saturated water column in the well. In a confined aquifer it makes little difference unless the change in water level is so great that the aquifer goes from confined to unconfined conditions. In an unconfined aquifer the Transmissivity is related to the aquifer thickness by

$$T=bK$$

Where K = hydraulic conductivity
B = aquifer thickness

The correction for aquifer thickness in this case is straight forward.

At this point is necessary to introduce the concept of superposition. Figure 6 is an illustration of the principle of superposition from a textbook by Fetter, 1994 showing the well interference for multiple wells. At any given point in an aquifer, the total drawdown is the sum of the individual drawdowns for each well. Because the Laplace equation is linear, the superposition of drawdown effects is found by simple addition. This means that we do not need to consider all of the drawdowns caused by wells for the impact analysis of the Telford Application, we only need to consider the impact from the Telford well. It is not clear that the Consultant considered this in performing his pumping analysis in the following section.

Pumping

This section is difficult to follow as the Consultant does not cite reference or provide sources for data. Apparently, the Consultant utilized IDWR pumping records to establish pumping rates at a number of wells in the area. He then uses this information for back calculating aquifer parameters. Of most interest in this section (for evaluating damage from the Telford application) is Table 2, which shows the historic record of pumping in nearby wells for the last 10 years. The Consultant goes through an exercise of calculating the water in storage in a 9 square mile area and states that the water in storage is greater



than 50,000 acre-feet. He makes a number of assumptions that are not valid regarding the total available water in the aquifer pore spaces. Just because a formation has a certain amount of porosity for storing water it does not mean all of that water can be recovered, as a matter of fact, this is never true. A basic tenant of groundwater hydrogeology is interconnected porosity. This is the porosity that is interconnected and excludes dead end pores. Further, at the aquifer scale, the interlayered nature of the formations leads to large pockets of water that are isolated and the water cannot flow to wells. The actual porosity used in his calculations should be about 10 times less than the 18.6 % used. Nevertheless, even using this highly inflated value it can be shown that during prolonged drought the water in storage will be exhausted.

The argument is presented that since the application only wants 800 af-ft per year, therefore plenty of water is available. However, this assumes that the aquifer is recharged annually. As noted previously, this is seldom the case, especially in recent years. Actually the applicants transfer is for 2,172 ac-ft on an annual basis. If less water is desired then the application should be reduced. If not, the full application must be used in all calculations, thus the applicant wants over 4% of the (highly inflated) volume in storage. As will be shown, the Applicant requires a significantly greater percentage of the water in storage.

Figure 7 of this report is a plot of the data from the Consultants Table 2 compared to flow in the Big Lost River near Arco. As can be seen, there are long periods where no surface water is available for recharging the aquifer, unfortunately, these periods of no recharge are the periods where groundwater pumpage is greatest. This makes sense because many users have supplemental groundwater rights for when there is no surface water. Furthermore, during droughts the weather is drier and hotter and more irrigation water is required. The fact that the greatest pumping occurs when recharge is at a minimum, rapidly exhausts aquifer storage. For instance, during the drought period from 2001 to 2004 where there was no flow in the Big Lost River near Arco and a total of 37,200 Ac-ft of water was pumped (per the Consultants numbers). Again, using the Consultant's inflated estimate of the water in storage of 50,000 ac-ft, this drought used 75 % of the water available in storage. Had the applicant's water right been in place during this four year period, the total water coming from storage would have been 45,688 ac-ft or 91% of storage. This is the root of the problem and the reason for the protest – there is not enough water in storage to support the applicants new POD in times of drought. Keep in mind that this analysis was performed using the Consultants numbers from his Table 2 and his estimate of aquifer storage!

Drawdown Analysis

This section describes the Consultants attempt to back out the transmissivity of the aquifer by matching the change in water levels in four wells measured at the beginning and end of the summer of 2010. The approach is not without merit as this is basically the approach used when computer models of aquifers are calibrated to water levels. However, in a fully functional model there are a number of boundary conditions and other factors that can be "tweaked" to find the best match to the data. The only knob the



Consultant can turn to match water levels is aquifer transmissivity. The shortcomings of the Consultants approach are:

- Numerous and significant violations of the Theis assumptions
- An unjustified assumption of aquifer storativity.
- No consideration given to the influx and lack of surface water
- Boundary conditions are ignored
- The approach does not represent the actual pumping and recovery of the wells in question (i.e. the assumption of 100 days of steady pumping is not valid and water levels will recover rapidly when the pump is shut off).

It is stated on the bottom of page 11 that all assumptions of the Theis method are in effect. Actually, most of the Theis assumptions are violated. The Theis method is the oldest, most rigorously tested and heavily used analytical method in ground water science. The Theis assumptions are mathematical simplifications that allow derivation of the aquifer properties. They are:

- homogeneous, isotropic, confined aquifer,
- well is fully penetrating (open to the entire thickness of aquifer),
- the well has zero radius (it is approximated as a vertical line) — therefore no water can be stored in the well, and the pumping well is 100% efficient, well has a constant pumping rate
- aquifer is infinite in radial extent,
- horizontal (not sloping), flat, impermeable (non-leaky) top and bottom boundaries of aquifer,
- Groundwater flow is horizontal
- no other wells or long term changes in regional water levels (all changes in potentiometric surface are the result of the pumping well alone)

Even though these assumptions are rarely all met, depending on the degree to which they are violated (e.g., if the boundaries of the aquifer are well beyond the part of the aquifer which will be tested by the pumping test) the solution may still be useful. The following critical flaws have been identified in the approach taken:

- As described here, the aquifer boundaries are apparent both in physical outcrop and in the break in the slope of the drawdown curve. The Consultants composite pumping cone of depression extends into the mountains to the west (see his Figures 5 through 8). Obviously, as plotted the drawdown is physically impossible.
- The Consultant did not make any instantaneous measurements of discharge from wells (i.e. flow) or measure water levels during pumping in all wells (i.e. while the pump was on). It is stated that the instantaneous flow rates were taken from IDWR but the reference is not provided. The calculated Theis drawdown from pumping is how the Consultant's model matches water levels (see his Table 3). Yet most water level measurements were taken when the pumps were off and the



pumping rates are not known other than by assuming the values measured at another time. How can the Consultant's Model be expected to match the data when these basic requirements are violated?

- There are no boundary conditions; either barrier boundaries or river (e.g. constant head) boundaries. The greatest limitation to the Consultant's Model is the mismatch between it and the physical realities of basin, in particular the flux of river and canal water into the composite cone of depression described by his approach. The flux of water into the system is so great it overwhelms the water levels causing them to remain or drop slightly with pumping, yet no attempt is made to account for this great flux of water to the system.
- The actual duration of pumping for each well is not confirmed, for all we know the pumps could have been shut off for the entire season or run only a few days. With an extremely high transmissivity of 500,000 ft²/d, water levels will recover very quickly after the pump is shut off.
- Even taken at face value, the 20% match to the data is not very good.
- As pointed out time and time again in this report and in our previous report, the impact to other users during wet years is not that important. What is important are impacts during droughts. Drought periods are not addressed in the Consultants report. The only way the Consultants approach can match water level declines during droughts is to reduce the aquifer transmissivity. If that was done, then impact to the protestant wells would be clearly demonstrated.

The consultants approach falls apart with a simple analysis. Consider his Table 3, showing the predicted drawdown for various transmissivities. Even at the lowest transmissivity, the largest drawdown calculated in any well (using superposition) is only 8.5 ft. By extrapolation, to match the 75 ft of water decline in wells during periods of drought, the transmissivity of the Consultants model would have to be reduced significantly below 50,000 ft²/day, maybe by a factor of 10 or more. Because 50,000 ft²/day is the lowest document measurement of transmissivity found for the Big Lost River Valley the Consultants approach rapidly becomes physically impossible.

As an alternative to the consultants approach we modify the Clearwater AQTESOLV approach to simulate the high water levels of the last 2 years. Basically, the approach taken by Clearwater was to calculate damages at the lowest point in the climatic cycle when there was no surface water recharge. This would be equivalent to the 2001 to 2004 time period. To modify the Clearwater model to represent the high water conditions and the minimal or even rising water levels pointed out by the Consultant, the stream flow of the Big Lost River had to be added to the model. To do this a constant head boundary was added along the eastern edge of the model domain to represent recharge from the Big Lost River. A constant head boundary supplies as much water to the system as needed to keep the water level constant. No other changes were made to the Clearwater AQTESOLV model and all other parameters and boundaries are identical as presented in the Clearwater Impact Assessment Report. Figure 8 is a plot for this model run showing the water levels in the proposed POD well and the Protestants wells with the proposed POD pumping at a rate of 2245 gpm. Note the dramatic difference that the constant head boundary makes to water levels in wells. Most water level declines are only about 2 ft.



These results show that with one simple modification the Clearwater model can simulate the high water conditions prevalent over the last couple years. It is interesting to note, the average water level decline of about 2 ft for the Clearwater model is fairly close to the measured water decline by the Consultant of 1 ft for the four wells measured during the summer of 2010.

The consultant ends this section by concluding:

Another very important conclusion is that the influx of surface water is greater than the drawdown of the wells. Conversely, the lack of surface water will draw the static water level down regardless of the volume of water pumped from the ground.

Again the Consultant has taken a short sighted, one season look at the water levels in the basin and said things are OK. It is certainly true that for one or more years in a row surface water recharge might exceed pumpage. Certainly this needs to occur to recharge the depleted aquifer storage. However, we have shown by historical water level records and by calculation that increased pumpage greatly accelerates the decline of water levels. Our analysis suggests that the carrying capacity of the valley may already be exceeded. The carrying capacity is not determined by the ability of the aquifer to store and transmit water *during times of plenty*. The carrying capacity is defined by how much water can be pumped *during periods of drought* when it is needed the most. That is the times that Clearwater focused on and demonstrated that the proposed transfer will damage nearby water users.

Conclusion

The Consultant wraps up his argument by presenting some unbelievably low drawdowns calculated using methods with shortcomings pointed out above. The transmissivity presented is at the very high end of transmissivities world wide. Nearly anywhere in the world a measured transmissivity of 500,000 ft²/day would be considered excellent or phenomenal. Yet the Consultant provides no physical evidence to support his calculations. As a matter of fact, his well log for the City of Moore presents a well with poor yield (his words). One must wonder where all the water is that he has calculated. The simple truth is that it isn't there. Wells with rising water levels after months of pumping are very rare, indeed, and can only exist where there are vast amounts of water recharging the system. This does occur in the Big Lost River Valley from time to time making it one of the most prolific aquifers in the state. But its capacity is not unlimited. We are at the limit of its long term capacity and as history has shown we already exceed its capacity during periods of drought.

The transfer application must not be approved. It would cause serious and profound damage to the neighboring users during times of drought. It would create an environment of ground water mining and trigger a water grab by all the downstream water users for better locations in an upstream direction.



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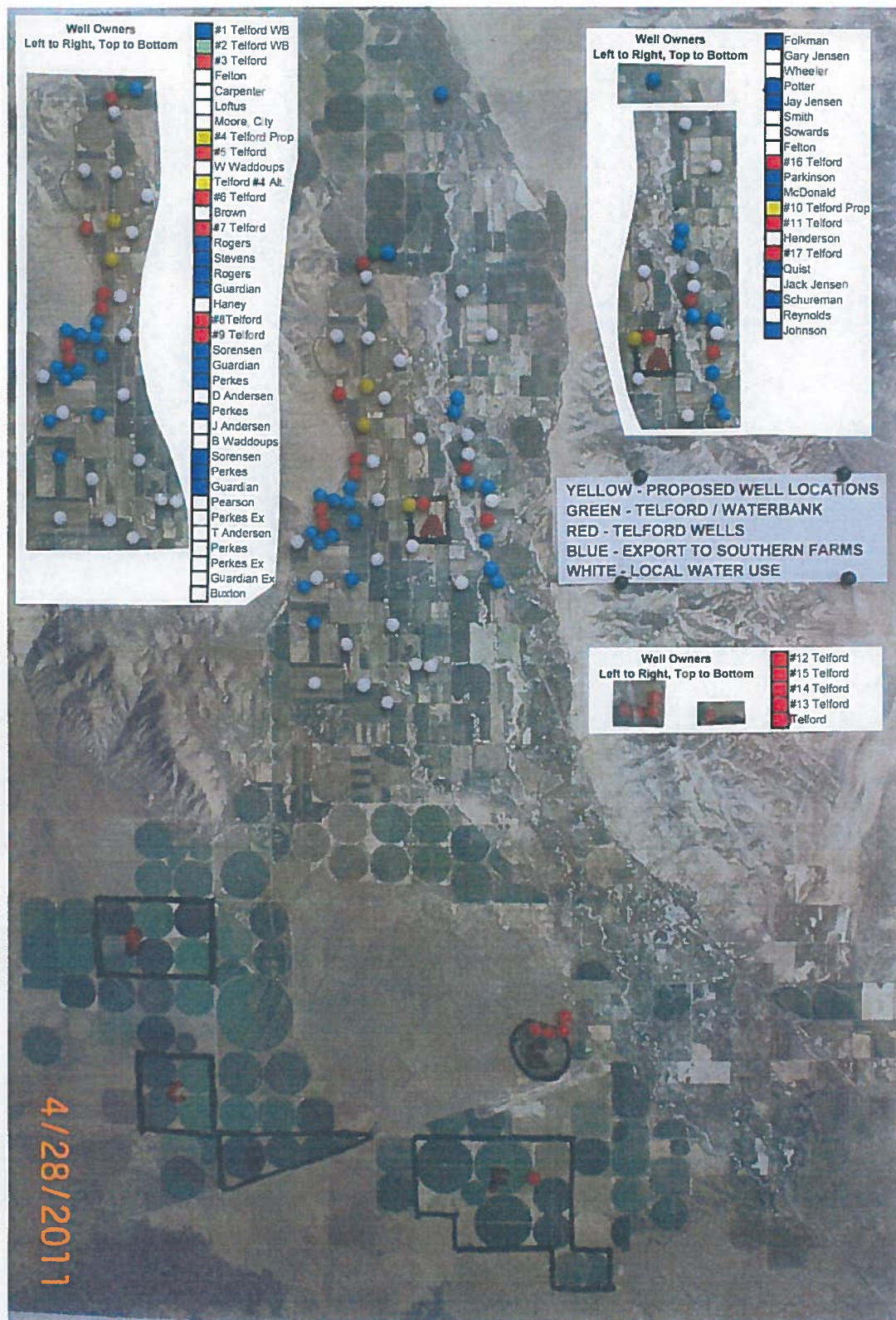


Figure 1 Map showing well locations, ownership and place of use (Jensen, 2011).



Shrinkage for Canal Stretches used by the Big Lost River Canal Company 2009 to 2010

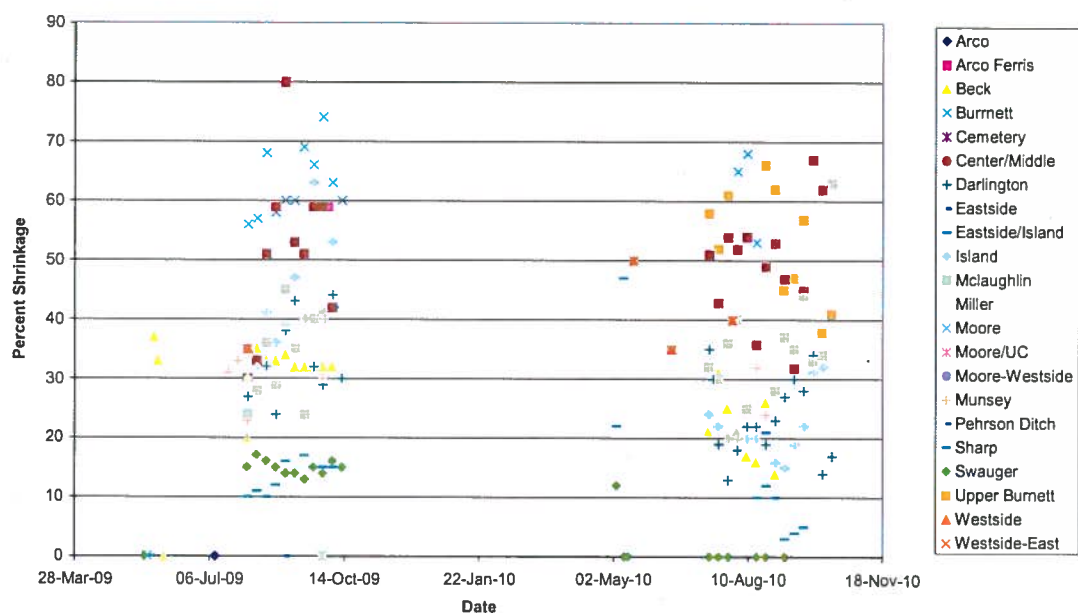


Figure 1.2 Canal Shrinkage for canals managed by the Big Lost River Canal Company.

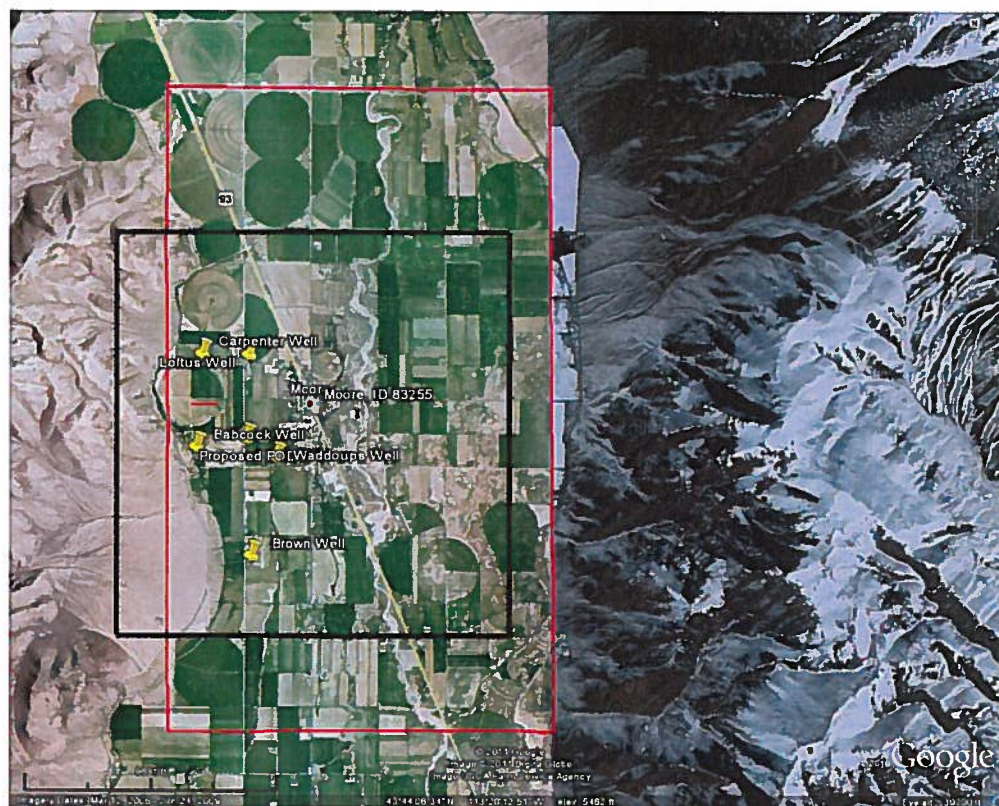
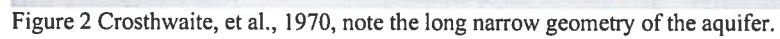


Figure 1-3 Comparison of the areas of concern for Clearwater Impact Analysis (15 sq mi in red) and the Consultants (9 sq mi in black)



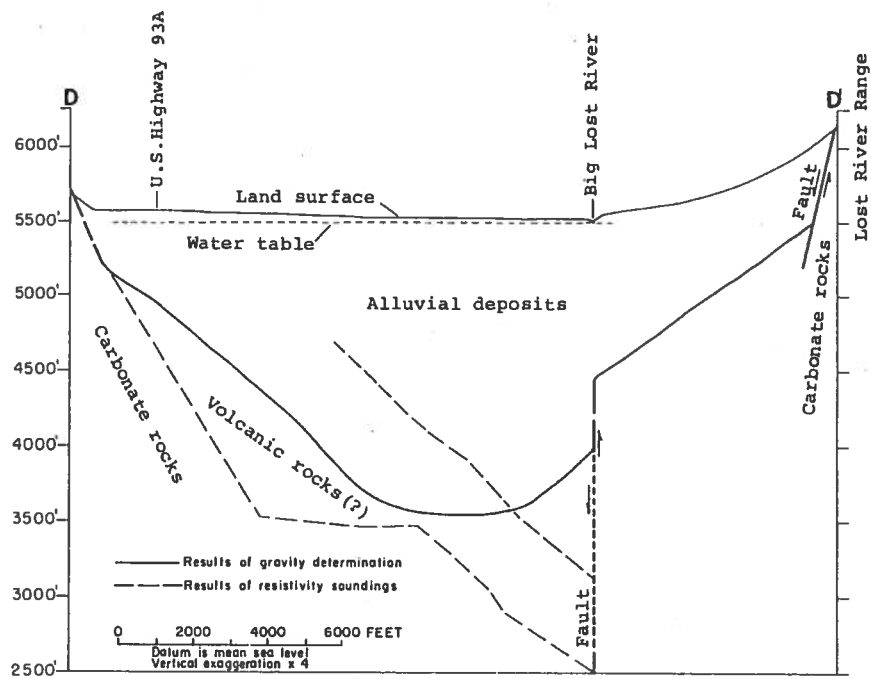


FIGURE 16.-- Geologic section D-D' north of Moore showing results of gravity and resistivity surveys. (After Mabey and Zohdy, 1968). (See fig. 10 for location of section).

Figure 3 Crosthwaite, et al., 1970, note the sharp boundaries to the aquifer caused by the surrounding mountains..

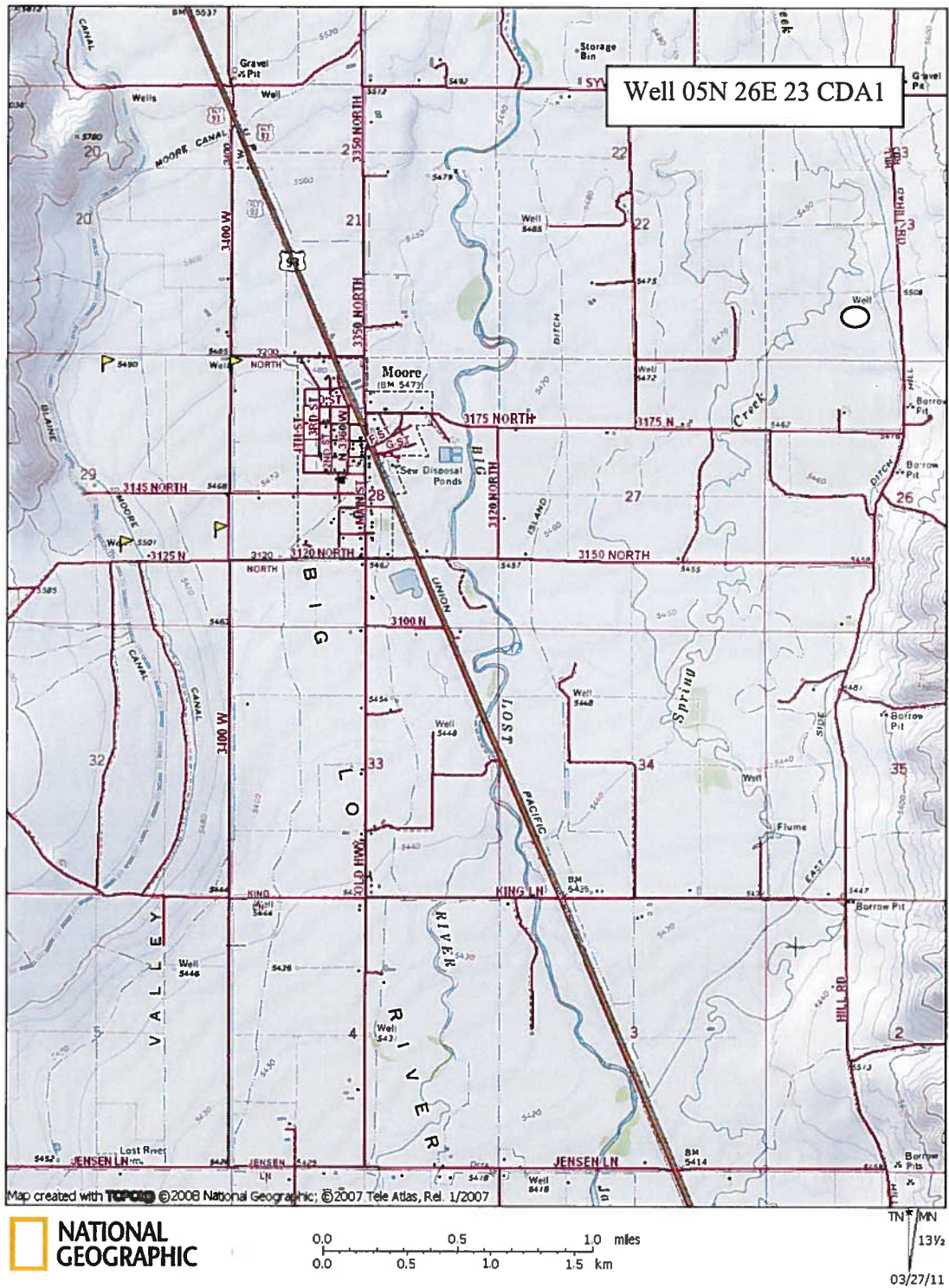


Figure 4 Location of Well05N 26E 23 CDA1

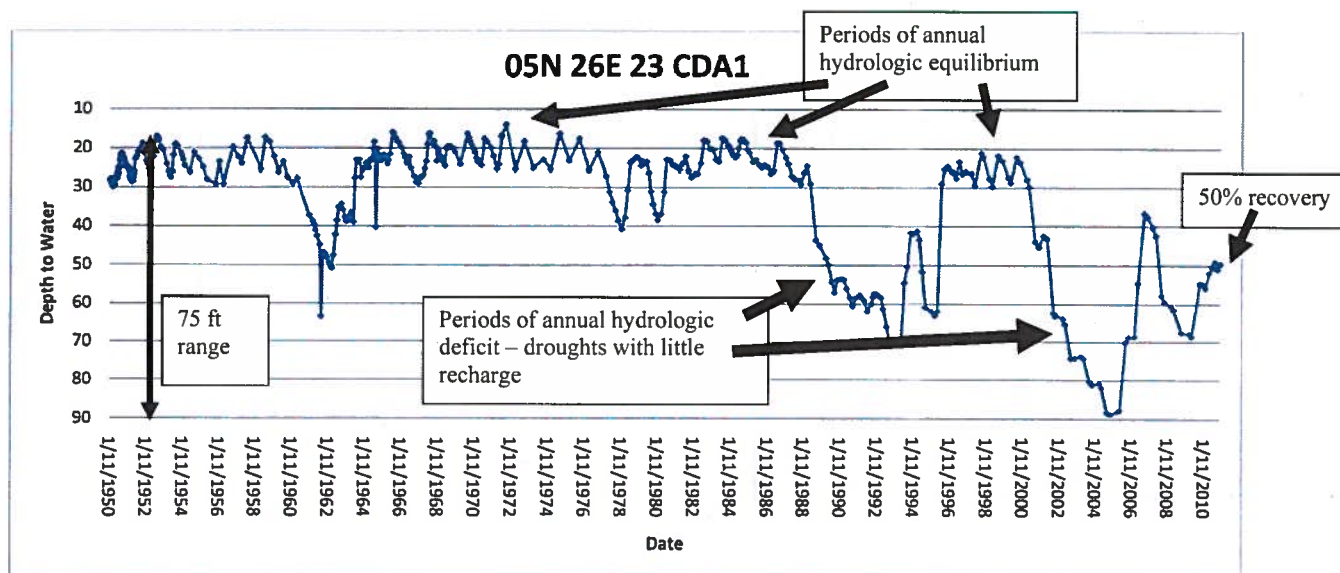


Figure 5 Hydrograph for Well 05N 26E 23 CDA1

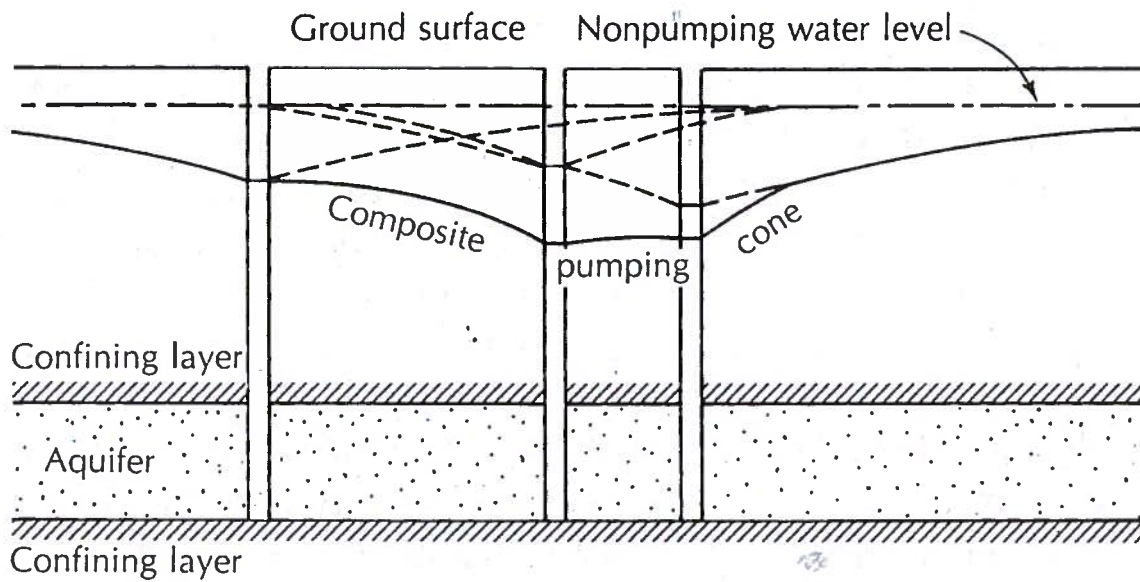


Figure 6 An illustration of the principle of superposition from Fetter, 1994 showing the well interference for multiple wells is presented graphically. At any given point in an aquifer, the total drawdown is the sum of the individual drawdowns for each well. Because the Laplace equation is linear, the superposition of drawdown effects is found by simple addition.

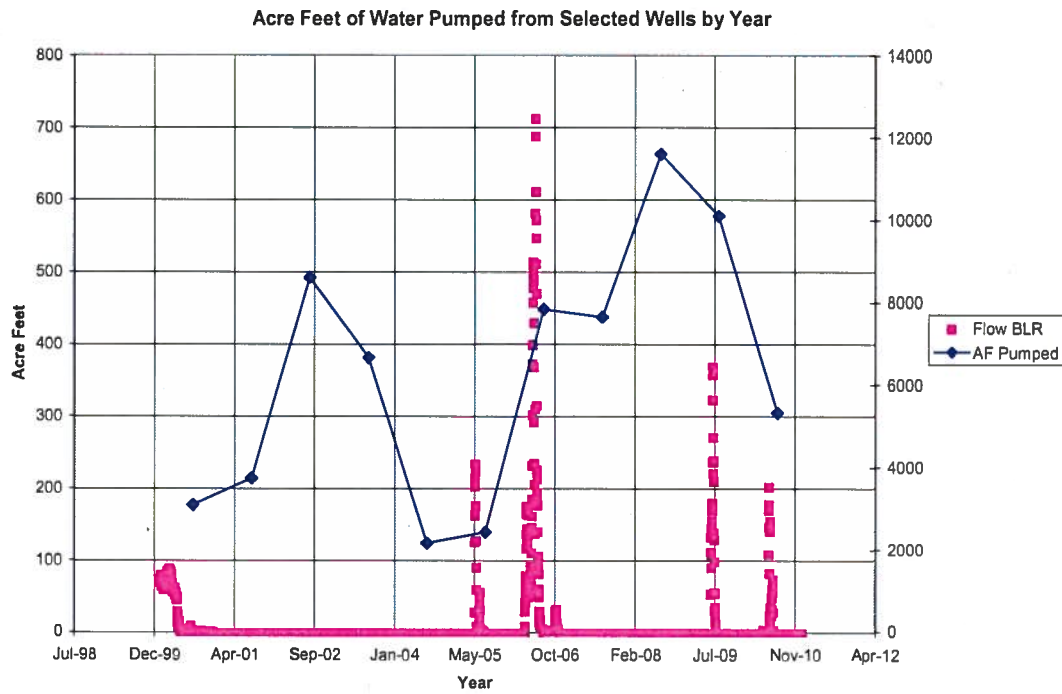


Figure 7 Acre Feet of water pumped annually from selected wells compared to flow in the Big Lost River near Arco for the period 2000 to 2010.

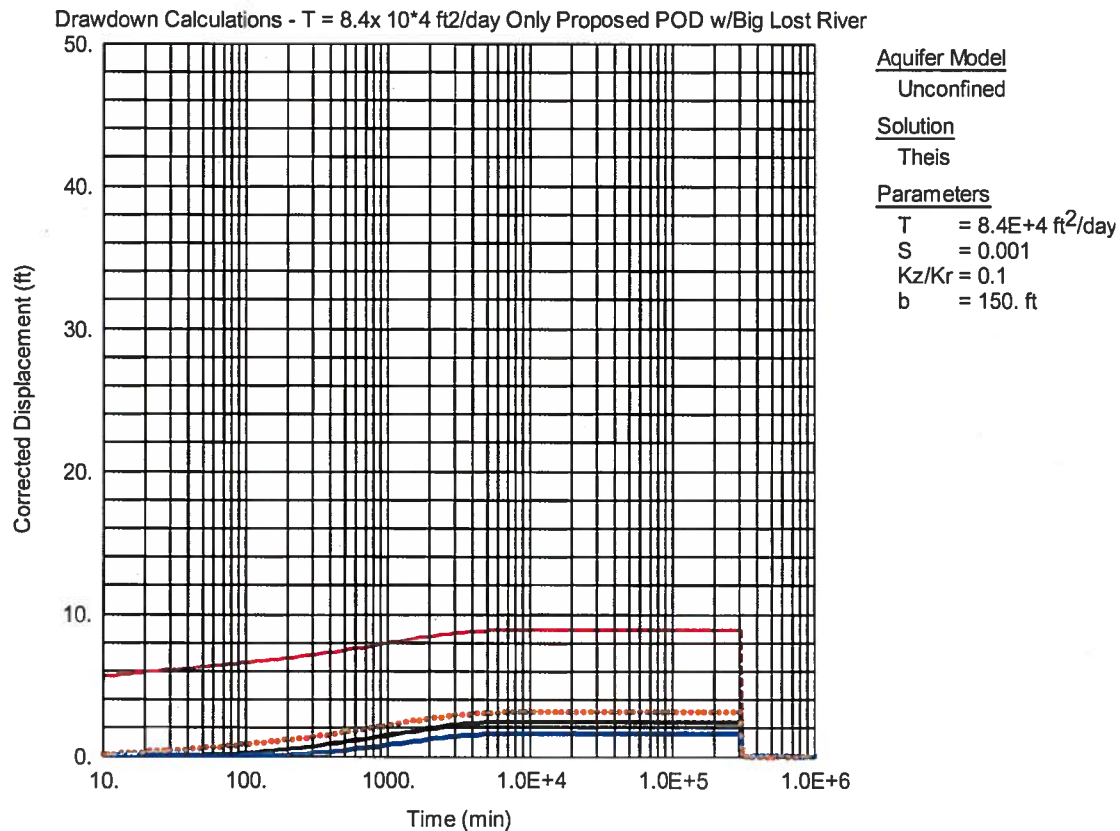
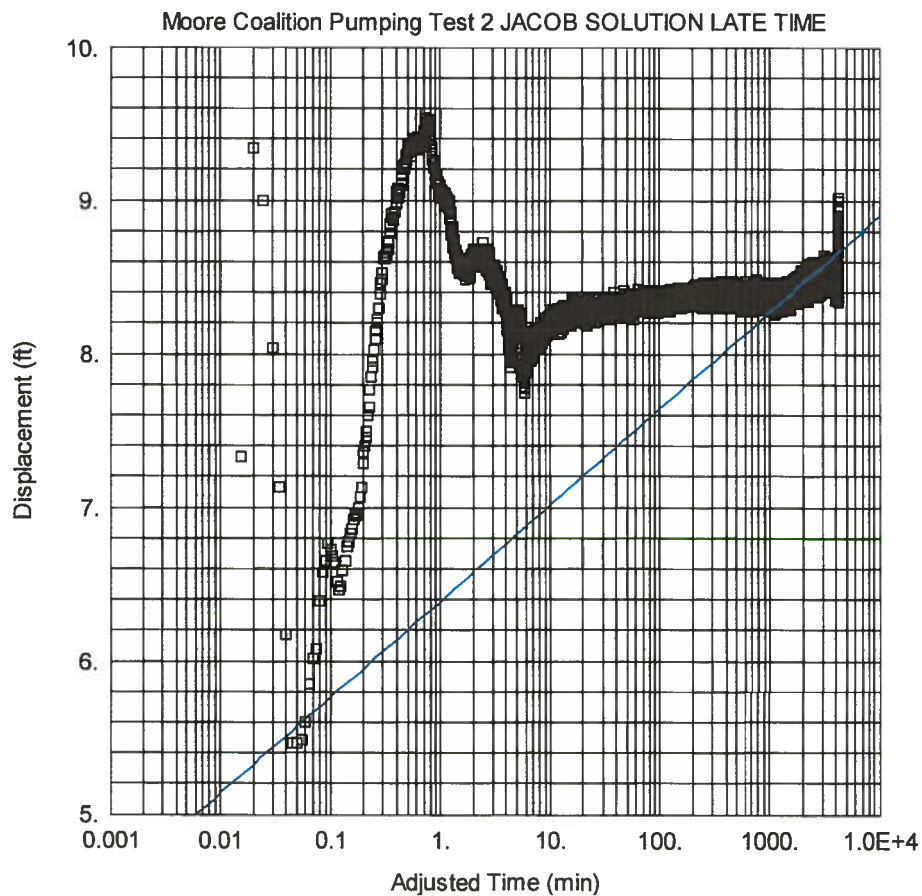
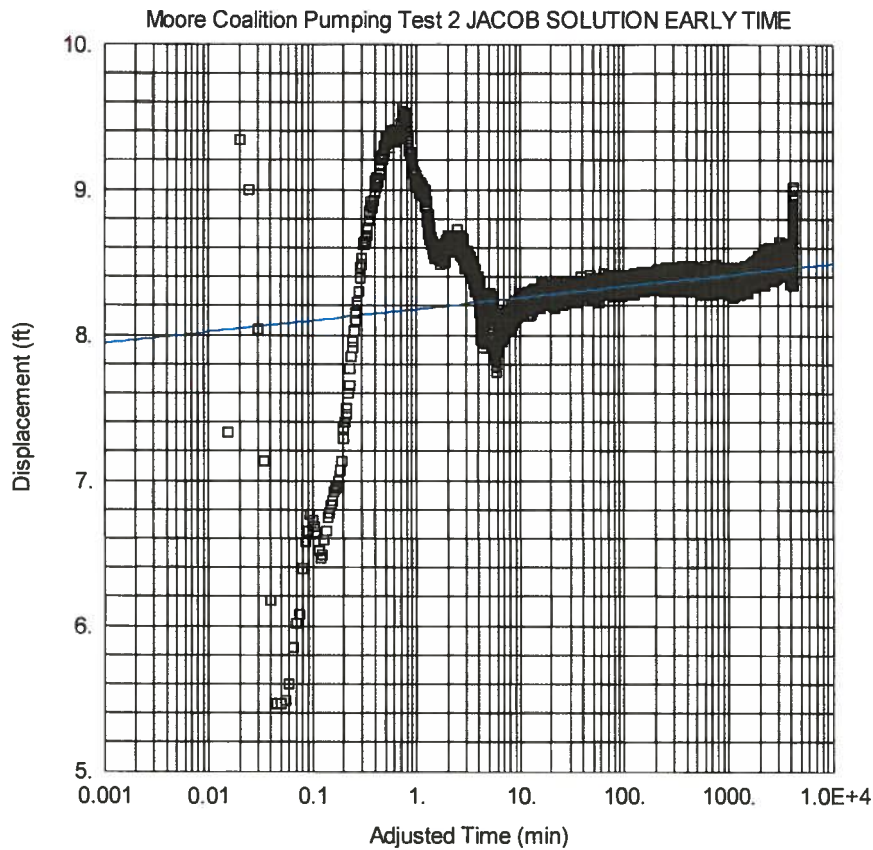


Figure 8 AQTESOLV plot for Clearwater Model with constant head boundary added to the east side of the domain to represent recharge from the Big Lost River. The pumping is only occurring in the new POD at a rate of 2245 gpm.

Key

- | | |
|--------------------|------------------------------|
| Red dashed line | = drawdown in new POD |
| Black solid line | = drawdown in Loftus Well |
| Green line | = drawdown in Carpenter Well |
| Orange dashed line | = drawdown in Waddoups Well |
| Blue line | = drawdown in Babcock Well |

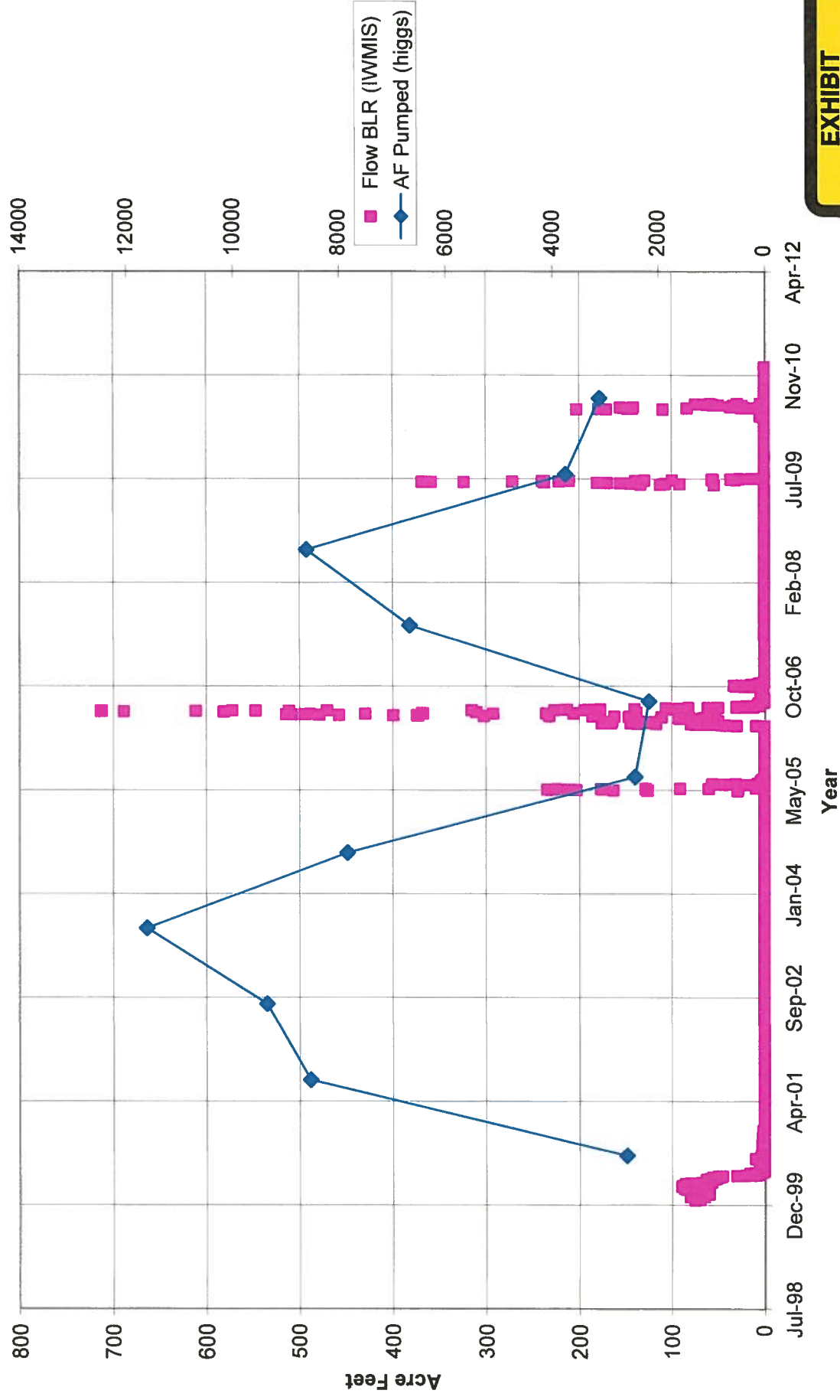


A2-1 Top
A2-2 Bottom

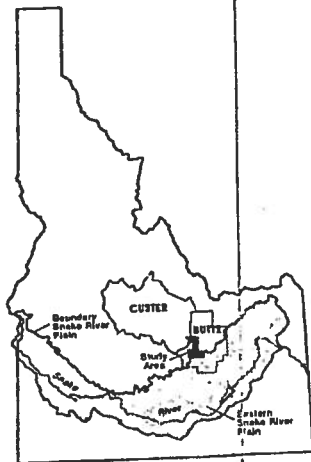


Comparison of Pumping to BLR Flow

Acre Feet of Water Pumped from Selected Wells by Year



INTRODUCTION



INDEX MAP OF IDAHO

The study area (see index map of Idaho), part of the Big Lost River drainage basin, is at the northern side of the eastern Snake River Plain. The lower Big Lost River Valley extends from the confluence of Antelope Creek and the Big Lost River to about 4 mi south of Arco and encompasses about 145 mi² (see map showing water-level contours). The study area is about 18 mi long and, at its narrowest, 4 mi wide. Arco, Butte City, and Moore, with populations of 1,016, 69, and 190, respectively, in 1990, are the only incorporated towns. The entire study area, except the extreme northwestern part, is in Butte County. The study area boundary is where alluvium and colluvium

pinch out and abut against the White Knob M. with lesser amounts of volcanic rock) on the v rock) on the east. Gravel and sand in the v boundary is approximately where Big Lost I basalt of the Snake River Group.

Spring ground-water levels and flow in t and the amount and timing of precipitation w water supply and water shortages are, there! Surface reservoir capacity in the valley (Mack 20 percent of the average annual flow of the l Stored surface water is generally unavailable to help relieve drought conditions in subsequ to supplement surface-water supplies and to i

Average annual flow of the Big Lost R station 13127000, not shown) in water years 1 ft; average annual flow of the Big Lost River n water-level contours) in water years 1947-6 (Harenberg and others, 1991, p. 254-255). M! Big Lost River at the Moore Diversion, 3 mi n and supply water for irrigation near the mar greater, water in the Big Lost River flows thr where it evaporates or infiltrates into the Sn average, water in the Big Lost River comm irrigation in the interior of the valley, evapor

This report describes the results of a stu the Idaho Department of Water Resources, to supply problems in the Big Lost River Val including 46 irrigation wells; (2) measurem estimation of annual ground-water pumpta analysis of results of an aquifer test conduct study may be inspected at the U.S. Geologic

DESCRIPTION OF AQUIFER TEST

Fourteen irrigation wells are sited in a 1-mi² area about 1.5 mi southwest of Moore. All but two are clustered in an area known locally as the "Well Orchard" (see map showing water-level contours). The Well Orchard supplies water to the Blaine Canal near the western margin of the valley. An aquifer test was conducted in the Well Orchard April 3 through 5, 1991.

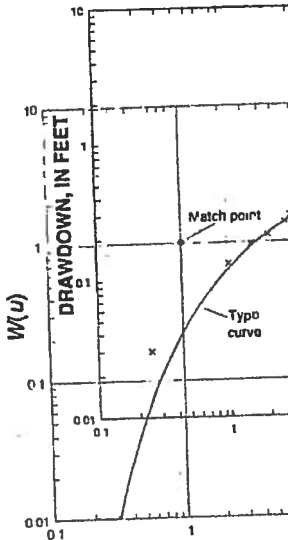
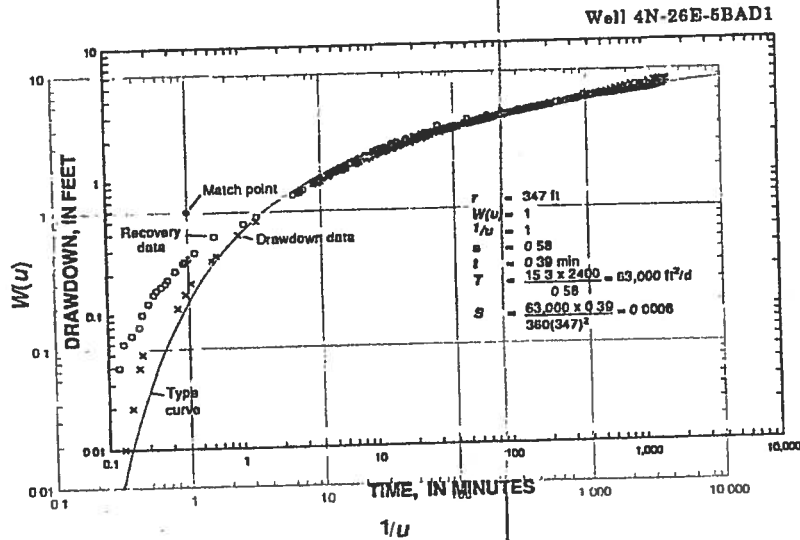
Most wells in the Well Orchard are 200 to 250 ft deep and are cased from land surface to the bottom of the hole. The casing is perforated from 50 to 60 ft below land surface to the bottom of the hole. Static water levels in April 1991 were 100 to 140 ft below land surface. Drillers' logs indicate that the aquifer consists of layered gravel, sand, and clay. The water level in one well rose 2 to 3 ft after a clay layer was penetrated, indicating local artesian conditions.

Water levels were measured in nine wells in the Well Orchard (see inset map showing aquifer test site) for 2 days prior to the start of the aquifer test. During that time, water levels declined slightly. No precipitation was recorded in the area for more than 3 weeks prior to the test.

Discharge from the pumped well (4N-2 ft of 10-in. mainline irrigation pipe to pre 4N-26E-5BAD1, 4N-26E-5BDA1, and 4N-2 with pressure transducers and data logger periodically with electrical or steel tapes th failed and reliable water-level measuremen

Well 5BAD2 was turned on at 0930 (hours until 1030 on April 4, 1991. During t measurements were made as frequently as 1 logger-transducer data were compared with verify results and to correct for measure pumped well was estimated by using a non 2,400 gal/min at the start of the test to abo

THEIS ANALYSIS

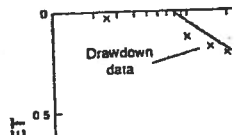


Drawdown was detected almost instantaneously in nearly all observation wells. Instantaneous drawdown, drillers' reports of clay layers, and the reported rise in water level after a clay layer was penetrated indicate that water in the aquifer is confined locally to some degree. Assumptions in the development of the Theis equation are most nearly met by confined aquifers (Heath, 1983, p. 37). Thus, the Theis type-curve method, as described by Lohman (1972, p. 15-19), was used to analyze the aquifer-test data. Logarithmic plots of time as a function of drawdown and time as a function of recovery were constructed for each observation well; resultant curves were matched to the Theis type curve. Convenient match points were chosen and transmissivities and storage coefficients were calculated by using the method developed by Lohman (1972, p. 15-19), modified to allow for different units:

where T is transmissivity, in feet square

where S is storage coefficient, dimension in minutes; u is the match point from the observation well, in feet.

JACOB ANALYSIS



DESCRIPTION OF AQUIFER TEST

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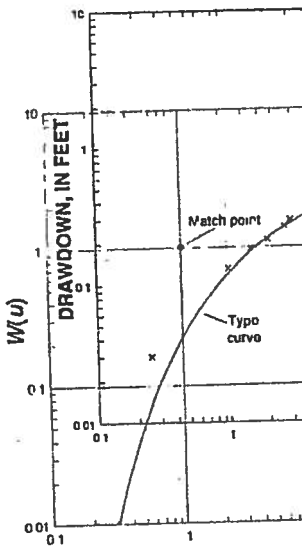
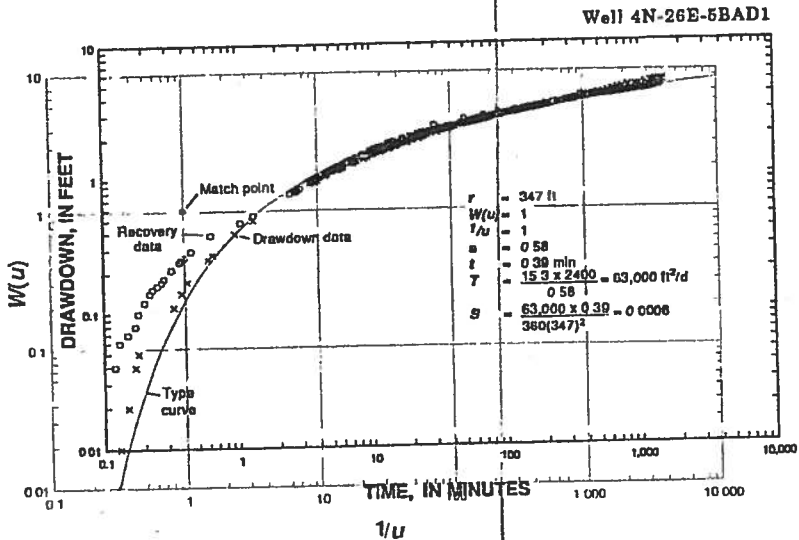
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THEIS ANALYSIS

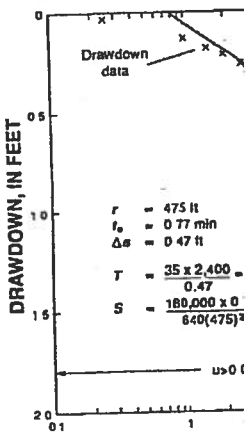
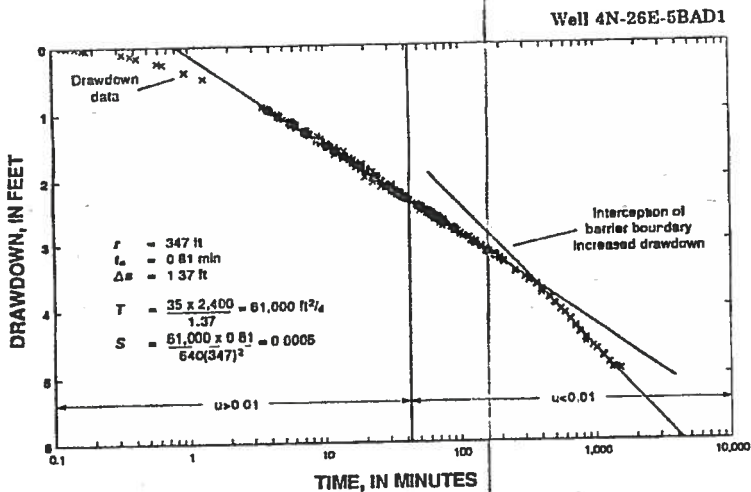


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where T is transmissivity, in feet squared the well function of u from the match point

where S is storage coefficient, dimensionless in minutes; u is the match point from the observation well, in feet.

JACOB ANALYSIS



Semilogarithmic plots of drawdown as a function of time were constructed for each observation well and analyzed by using the straight-line method developed by Jacob (Heath, 1983, p. 38). The Jacob method is applicable only to that part of the cone of depression where steady-state conditions prevail or to the entire cone only after steady-state conditions have developed. These conditions are met when $u = (r^2 S) / (4 T t)$ is less than 0.01 (Lohman, 1979, p. 22). Steady-state conditions were achieved when (modified from Heath, 1983, p. 38):

$$t = 36,000 r^2 S / T \quad (3)$$

where t is the time steady-state conditions develop, in minutes; r is distance from the pumped well, in feet; S is storage coefficient; and T is transmissivity, in feet squared per day.

Only data collected after steady transmissivities and storage coefficients

where T is transmissivity, in feet square is drawdown, in feet, across one log cycle

where T is transmissivity, in feet square line intersects the zero-drawdown line; :

RESULTS OF AQUIFER TEST

The Theis type-curve analysis indicated that aquifer transmissivity ranged from 61,000 to 330,000 ft²/d; values of 130,000 to 200,000 ft²/d were most probable (see table at right). Storage coefficients ranged from 0.0001 to 0.02; the value of about 0.001 was most probable.

TRANSMISSIVITY ESTIMATED FROM

Well number	Transmissivity (Theis), in feet squared per day
-------------	---

undifferentiated sedimentary rock River Range (chiefly sedimentary the main aquifer. The southern intercalates with or abuts against

depend primarily on temperature ainage basin. Periods of abundant e amount of annual precipitation. t 20 mi northwest of Moore) is only oothwaite and others, 1970, p. 3). n years of abundant water supply rmers have drilled irrigation wells acreage.

y Reservoir near Mackay (gaging d 1920-90 was about 224,600 acretation 13132500; see map showing 1983-90 was about 79,000 acre-ft st Side Ditch divert water from the map showing water-level contours)

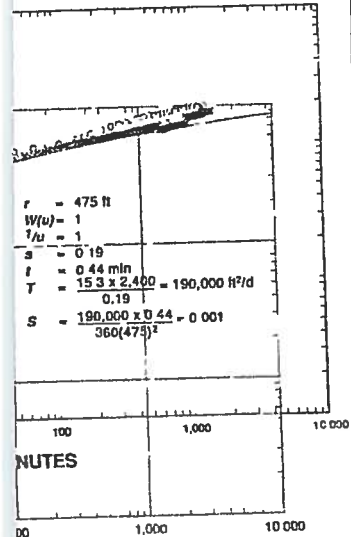
When water supply is average or ea and onto the Snake River Plain, uifer. When water supply is below ch Arco; rather, it is diverted for to the valley-fill aquifer.

ological Survey, in cooperation with data needed to help address water- ed (1) field inventory of 81 wells, ls in 154 wells in March 1991; (3) from 1984 through 1990; and (4) ore. All data obtained during this istrict office, Boise.

nted from the test site through 1,500 e during the test. Observation wells oe pumped well were instrumented all observation wells were measured The transducer in the pumped well e in that well during the test.

nd was pumped continuously for 25 of pumping and recovery, water-level to help define aquifer response. Data ade with electrical and steel tapes to strument drift. Discharge from the meter. Discharge ranged from about er 25 hours of pumping.

Well 4N-26E-5BDA1



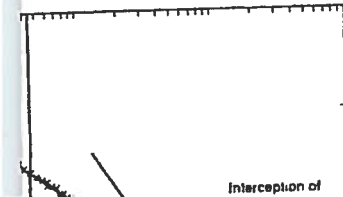
(1)

harge, in gallons per minute; $W(u)$ is ; and s is drawdown, in feet; and

(2)

ivity, in feet squared per day; t is time, i distance from the pumped well to the

Well 4N-26E-5BDA1



Interception of

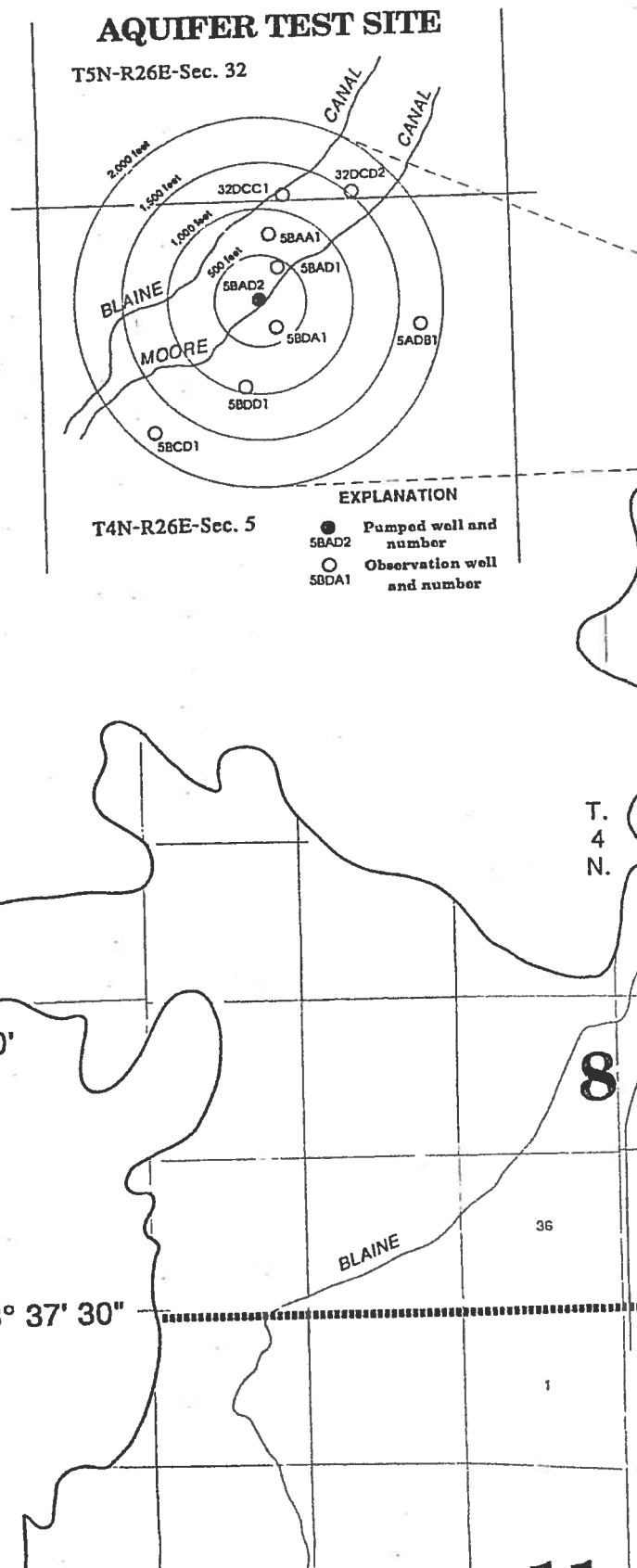
WHITE

KNOB

MOUNTAINS

43° 37' 30"

113° 30'



AQUIFER TEST SITE

T5N-R26E-Sec. 32

T4N-R26E-Sec. 5

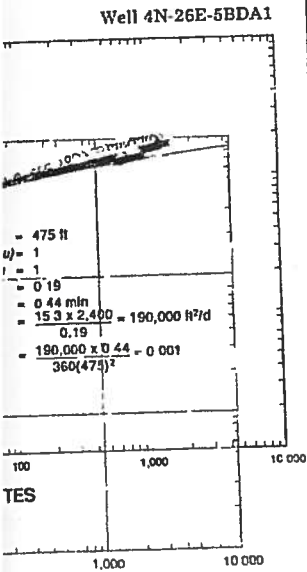
EXPLANATION

- Pumped well and number
- Observation well and number

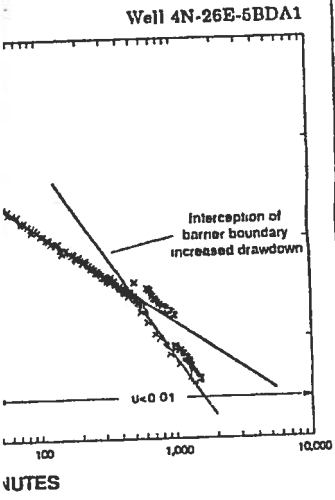
All data obtained during this
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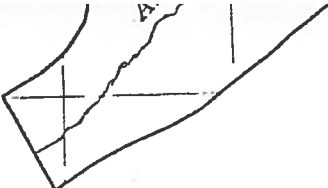


(1)
arge, in gallons per minute; $W(u)$ is
nd s is drawdown, in feet; and
(2)
 y , in feet squared per day; t is time,
stance from the pumped well to the



leveloped were used to calculate
(4)
arge, in gallons per minute; and Δs
(5)
time, in minutes, when the straight
n the pumped well, in feet.

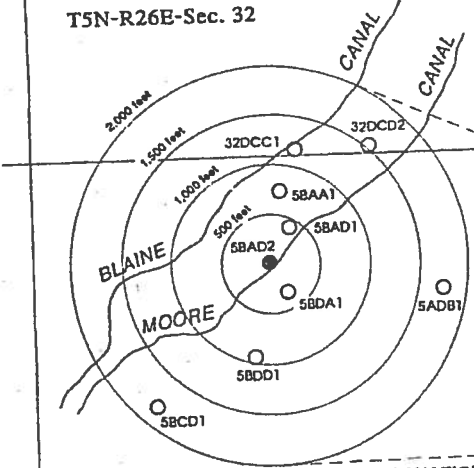
IE COEFFICIENTS
LIGN ANALYSES



T. 5
N.

AQUIFER TEST SITE

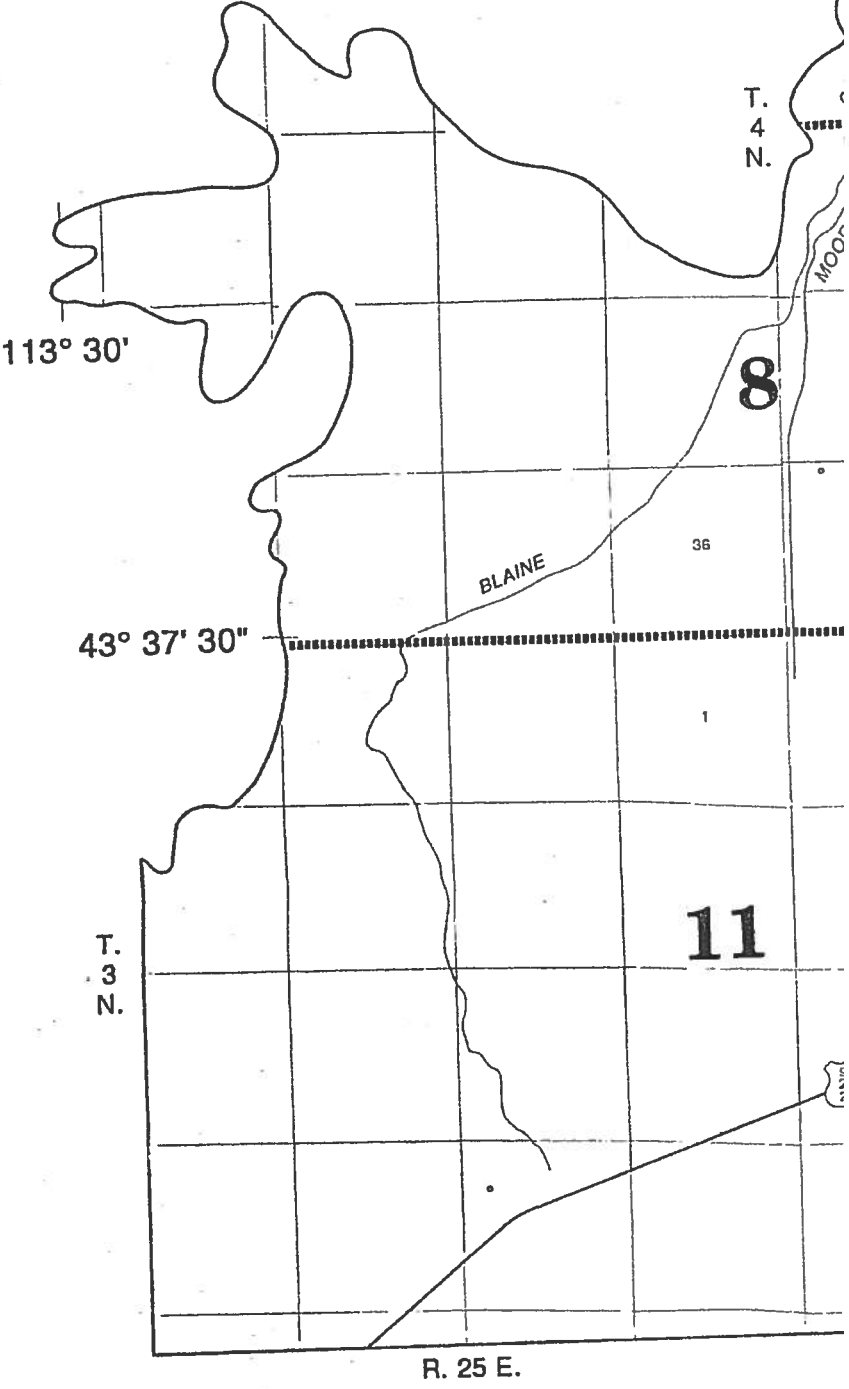
T5N-R26E-Sec. 32



T4N-R26E-Sec. 5

EXPLANATION
● Pumped well and
number
○ Observation well
and number

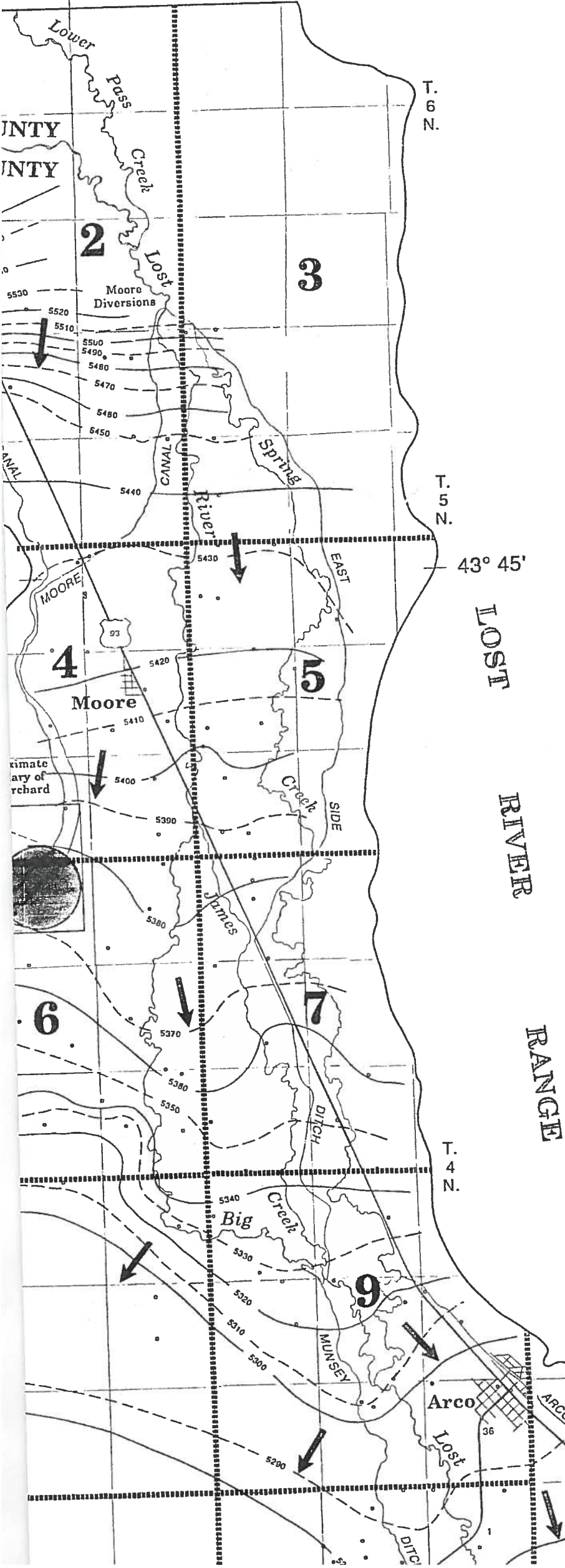
WHITE



Base from U.S. Geological Survey
1:100,000 quadrangles

WATER 11

113° 22' 30" R. 26 E.



CONVERSION FACTORS VERTICAL DATUM

Multiply	By
acre	4,047
acre-foot (acre-ft)	1,233
foot (ft)	0.3048
foot squared per day (ft ² /d)	0.09290
gallon per minute (gal/min)	0.06309
inch (in.)	25.4
kilowatt-hour (kWh)	3,600,000
mile (mi)	1.609

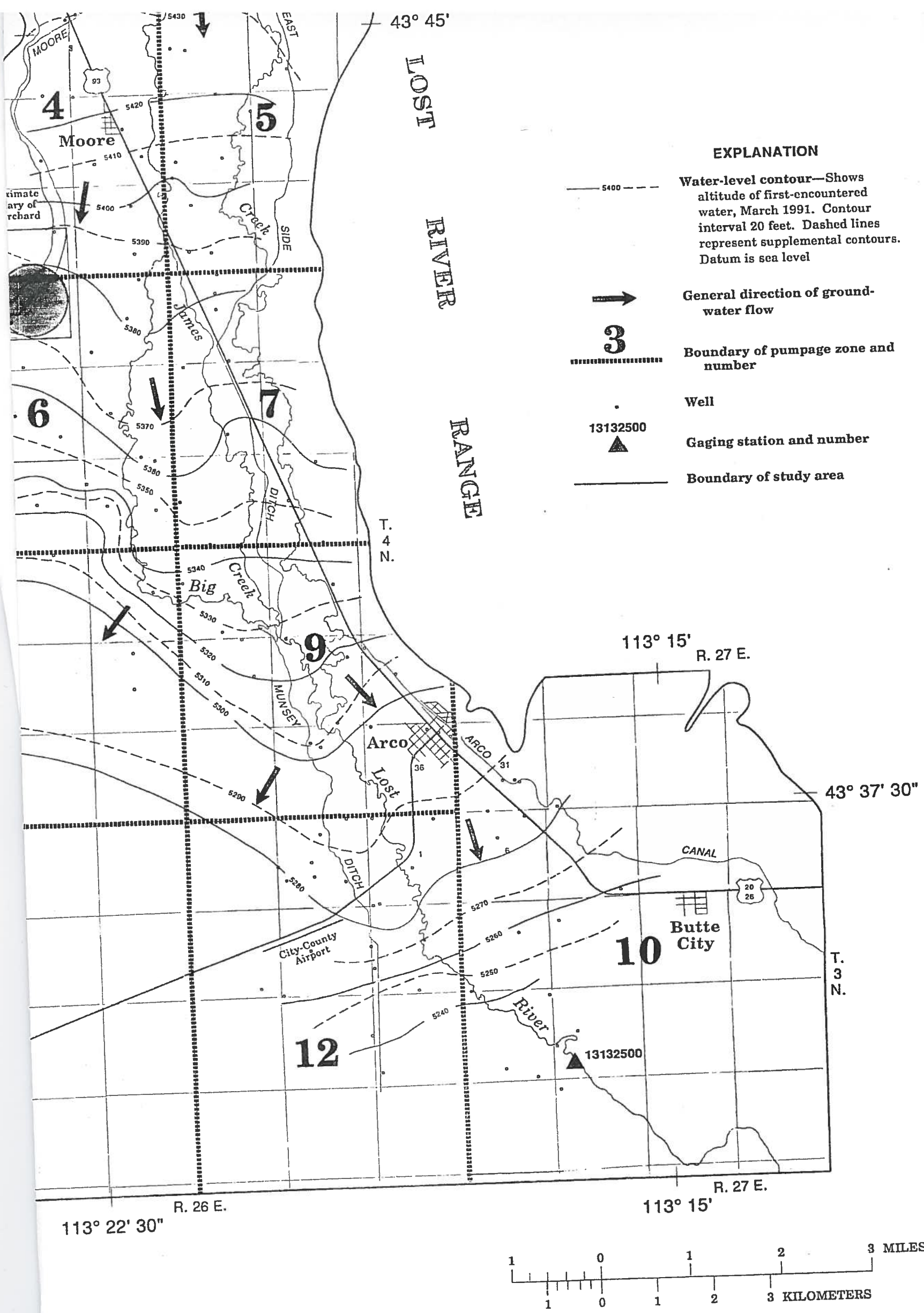
Sea Level: In this report, "sea level" refers to the National Geodetic datum derived from a general adjustment of the first United States and Canada, formerly called Sea Level Datum of 1929.

EXPLANATION

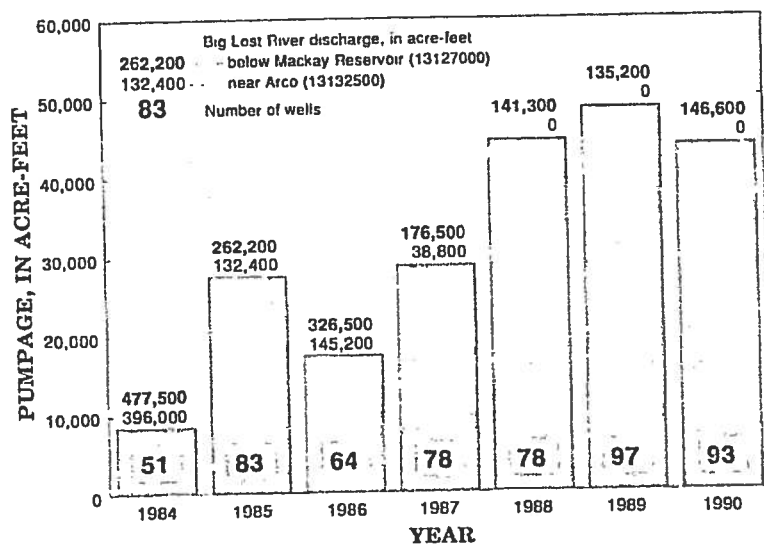
- 5400 — Water-level contour—Shows altitude of first encounter water, March 1991. Contour interval 20 feet. Dashed lines represent supplemental contours. Datum is sea level.
- General direction of groundwater flow
- 3 Boundary of pumpage zone number
- Well
- 13132500 Gaging station and number
- Boundary of study area

113° 15' R. 27 E.

43°



GROUND-WATER PUMPAGE FOR IRRIGATION



Ground-water pumpage for irrigation was estimated from electrical-power records obtained from Lost River Electrical Cooperative, Inc., for 1984 through 1990. Annual pumpage volumes were estimated by using the relation described by Bigelow and others (1987, sheet 1):

$$Q = kWh / [(K)(TH)] \quad (6)$$

where Q is pumpage, in acre-feet; kWh is kilowatthours used; K is kilowatthours required to lift 1 acre-ft of water 1 ft; and TH is total head (pumping lift plus system head), in feet. At 100-percent efficiency, K equals 1.02 $kWh/acre-ft$; that is, it takes just over 1 kilowatthour to lift 1 acre-ft of water 1 ft (Goodell, 1988, p. E19). Actual values of K are much higher owing to inefficiencies of irrigation pumps. A K value of 1.92, developed from efficiency data reported by Lost River Electrical Cooperative, Inc., was used for this study. The pumping lift part of total head includes static lift plus pumping drawdown. Assigned system head was based on irrigation-system type; low-head pivots were assigned 63 ft, impact pivots 208 ft, and other sprinkler types (hand lines and wheel lines) 116 ft. No additional head was assigned to wells with open discharge to canals or ditches.

Pumpage during 1984–90 ranged from about 10,000 acre-ft in 1984 to nearly 50,000 acre-ft in 1989. The average annual ground-water pumpage for irrigation in the study area was about 31,000 acre-ft. Pumpage was minimum in 1984 when flow in the Big Lost River was above normal and 51 wells were pumped. Pumpage was maximum in 1989 when flow in the Big Lost River was below normal and 97 irrigation wells were pumped. During the low-water years of 1988–90, no water reached the Big Lost River gaging station near Arco.

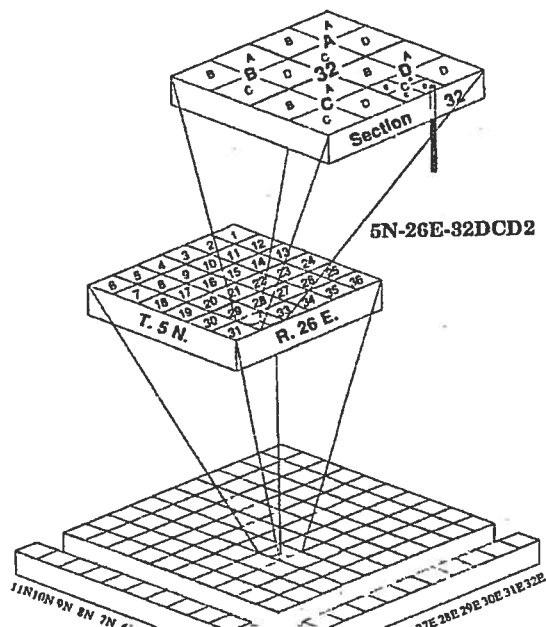
Ground-water pumpage zones (see map showing water-level contours) were established to show areal variations in annual pumpage. The table below shows annual ground-water pumpage by zone.

ANNUAL GROUND-WATER PUMPAGE BY ZONE

(Values in acre-feet)

Zone number	1984	1985	1986	1987	1988	1989	1990
1	630	1,200	330	1,300	1,400	1,300	1,500
2	1,200	1,800	2,100	1,700	1,100	3,000	3,200
3	790	1,600	900	1,300	1,600	1,900	1,600
4	820	4,100	2,500	4,100	8,800	9,400	7,900
5	1,100	2,700	1,100	3,500	4,400	6,500	5,700
6	1,600	7,300	4,300	10,000	14,000	13,000	13,000
7	560	3,500	1,400	2,700	5,600	5,600	4,300
8	410	2,400	2,100	2,300	3,900	3,600	3,500
9	0	1,300	1,100	760	1,800	1,800	1,200
10	50	11	0	0	120	38	120
11	0	0	0	0	0	0	0
12	1,200	1,500	1,400	1,000	1,900	2,800	1,800
TOTAL	8,400	27,000	17,000	29,000	45,000	49,000	44,000

WELL-NUMBERING SYSTEM



acre-ft of water 1 ft; and TH is total head (pumping lift plus system head), in feet. At 100-percent efficiency, K equals 1.02 kWh/acre-ft; that is, it takes just over 1 kilowatthour to lift 1 acre-ft of water 1 ft (Goodell, 1988, p. E19). Actual values of K are much higher owing to inefficiencies of irrigation pumps. A K value of 1.92, developed from efficiency data reported by Lost River Electrical Cooperative, Inc., was used for this study. The pumping lift part of total head includes static lift plus pumping drawdown. Assigned system head was based on irrigation-system type; low-head pivots were assigned 63 ft, impact pivots 208 ft, and other sprinkler types (hand lines and wheel lines) 116 ft. No additional head was assigned to wells with open discharge to canals or ditches.

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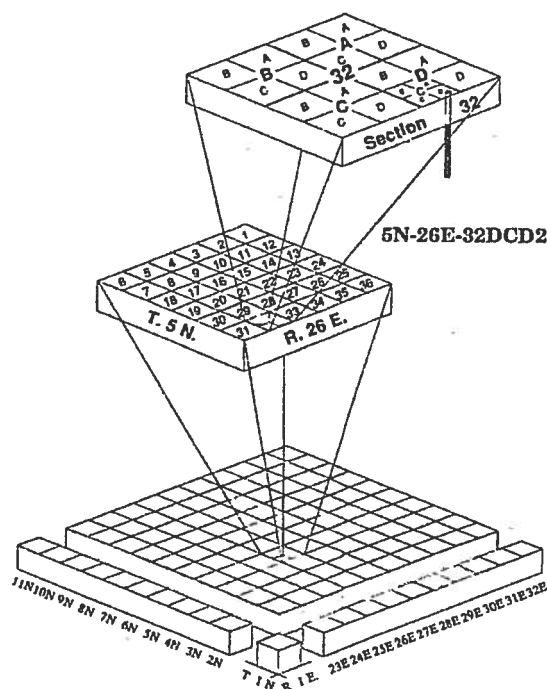
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5	1,100	2,700	1,100	3,500	4,400	6,500	5,700
6	1,600	7,300	4,300	10,000	14,000	13,000	13,000
7	560	3,500	1,400	2,700	5,600	5,600	4,300
8	410	2,400	2,100	2,300	3,900	3,600	3,500
9	0	1,300	1,100	760	1,800	1,800	1,200
10	50	11	0	0	120	38	120
11	0	0	0	0	0	0	0
12	1,200	1,500	1,400	1,000	1,900	2,600	1,800
TOTAL	8,400	27,000	17,000	29,000	45,000	49,000	44,000

WELL-NUMBERING SYSTEM



The well-numbering system used by the U.S. Geological Survey in Idaho indicates the location of wells within the official rectangular subdivision of the public lands, with reference to the Boise base line and Meridian. The first two segments of the number designate the township (north or south) and range (east or west). The third segment gives the section number, followed by three letters that indicate the 1/4 section (160-acre tract), 1/4-1/4 section (40-acre tract), and the 1/4-1/4-1/4 section (10-acre tract), and the serial number of the well within the tract.

Quarter sections are lettered A, B, C, and D in counterclockwise order from the northeast quarter of each section. Within the quarter sections, 40-acre and 10-acre tracts are lettered in the same manner. Well 5N-26E-32DCD2 is in the SE1/4 SW1/4 SE1/4, sec. 32, T. 5 N., R. 26 E., and was the second well inventoried in that tract.

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